CANADIAN GEOGRAPHICAL JOURNAL

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MARCH 1953

Daddy, what is stainless steel?

"Stainless steel is steel that doesn't stain. Most metals turn dark when acids or chemicals touch them. Even in the air, silver turns dark, copper roofs turn green, iron gets red with rust. If the right proportions of chromium and nickel are mixed into the steel when it is being made, it becomes 'stainless', even in many acids or chemicals, and also becomes rust-proof."

"Is it used for anything besides saucepans like these new ones of mother's?"

"Yes, the huge cooking pots in food plants are stainless steel. So is our sink bowl, not only because it's so easy to keep clean, and rust-proof, but also because it is so hard and strong it doesn't scratch or dent. Stainless steel is also used in hundreds of industries where acids and other chemicals are handled. Whole railway coaches are made of stainless steel because it is so tough and strong, and doesn't even need to be painted."

"The Romance of Nickel" a 72 page book fully illustrated, will be sent free on request to anyone interested.

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CANADIAN GEOGRAPHICAL JOURNAL

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Ontario and Quebec: F. A. DALLYN

Toronto office — 21 King Street, E.

Montreal office — 1000 St. Antoine Street (Tel. UN. 6-5285).

Europe: S/L W. H. CORKILL, M. B. E., The Mead, West Dumpton Lane, Ramsgate, Kent, England.

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Photograph by George Hunter, courtesy Manitoba Department of Industry and Commerce.

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Manufacturing in Manitoba
—Growth and Trends

by REX E. GROSE

MANITOBA has been engaged in manufacturing from its earliest days. At first industrial activity consisted almost entirely of exploiting virgin natural resources, with only the minimum of manufacturing necessary to get certain bulky products to distant markets and to satisfy some of the immediate needs of the residents. In recent years manufacturing in the province has become much more diversified. It has been in the last decade that the province has experienced its largest expansion of its manufacturing industries. The size of many of the new plants in the area and the numerous and varied products turned out are impressive. The increase in manufacturing activity has not been artificial or "war or defence" induced and the major portion of it has been soundly conceived and along the lines adaptable to the province's potentialities. As a result, Manitoba firms are today making a larger proportion of the goods consumed in Canada than ever before.

In appraising the prospects for further

At top: Final assembly and inspection of farm transformers for use in extensive rural electrification programs being carried out in Western Canada. The Manitoba factory where these transformers are made produces more farm transformers than any other firm in Canada.

growth and development of the industrial segment of the economy of Manitoba, it is desirable to seek out those factors favourable to industry which have so greatly facilitated the industrial development of the province in the past decade. The purpose of this article is to show the principal changes and trends of manufacturing in Manitoba in recent years. It is also hoped that it will indicate those factors which in the future can be counted upon to play a continuing part in the industrial development of the province.

The types of manufacturing found in any area are not fundamentally the result of human over-all planning nor of accident, but rather of relative advantage. There are four main factors influencing the location of industry in any area. They are: (1) material resources of the area; (2) markets; (3) power, and (4) labour. It is proposed to deal briefly with these factors and the influence they have exerted on manufacturing in Manitoba.

It is perfectly obvious that the industrialist whose manufacturing activities depend heavily upon raw materials will locate as closely as possible to those sources of raw or semi-manufactured materials required for his type of operation. Such an industry may be considered "material-oriented". In Manitoba raw-material-oriented industries employ approximately one-quarter of the persons engaged in manufacturing.

A knowledge of the major resources of Manitoba gives a clearer picture of the province, for, as indicated above, it is upon these resources that almost 25 per cent of the persons employed in manufacturing depend.

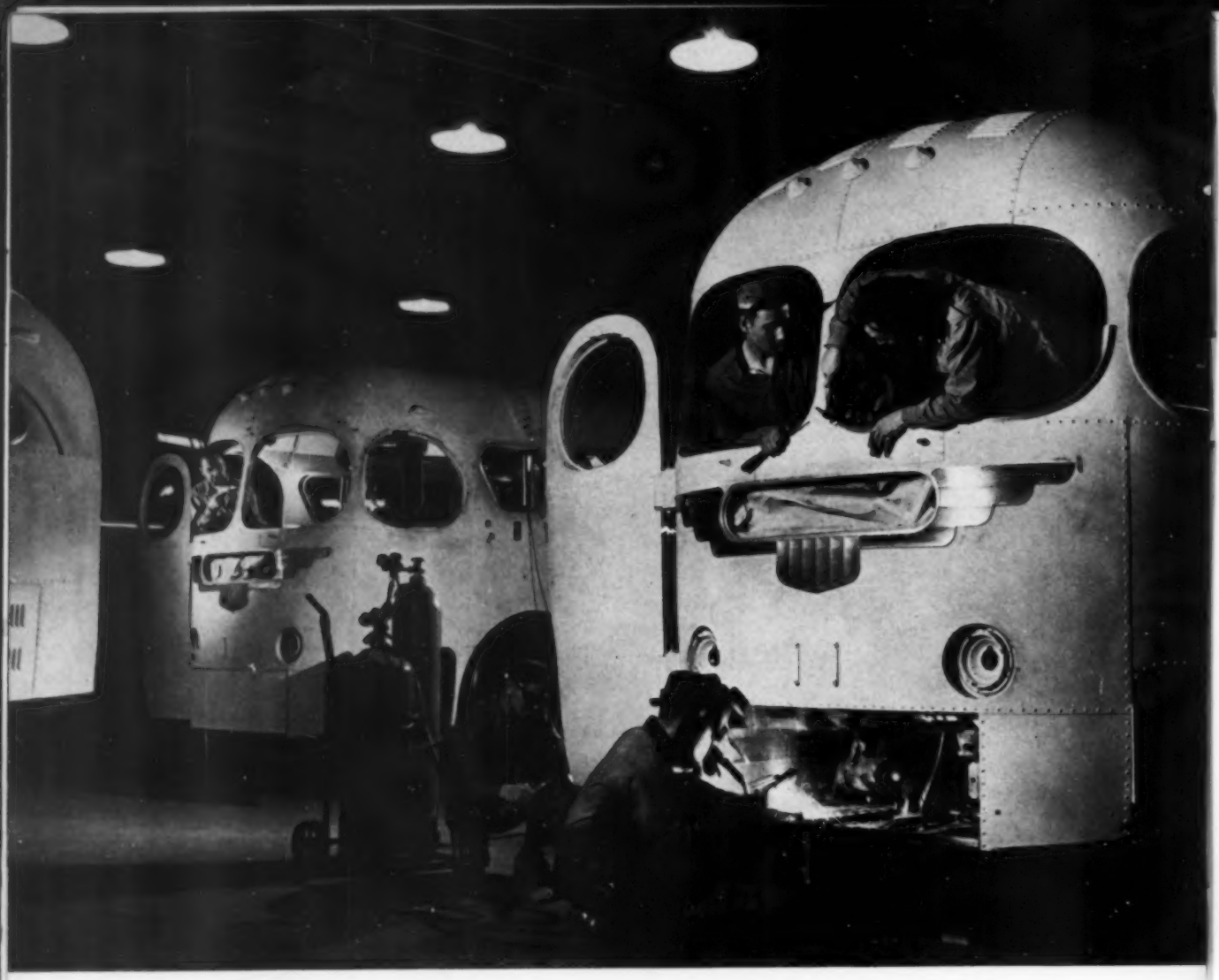
Agriculture is the chief economic activity. With a little more than 17,730,393 acres of farm land under cultivation, Manitoba farmers produced an estimated $240 million worth of cereal grains in 1952, as compared with some $60 million in 1939. Wheat constitutes the main crop of the province in acreage sown, but is closely followed by barley, oats, and flax. The province is noted for its great variety of agricultural activities.

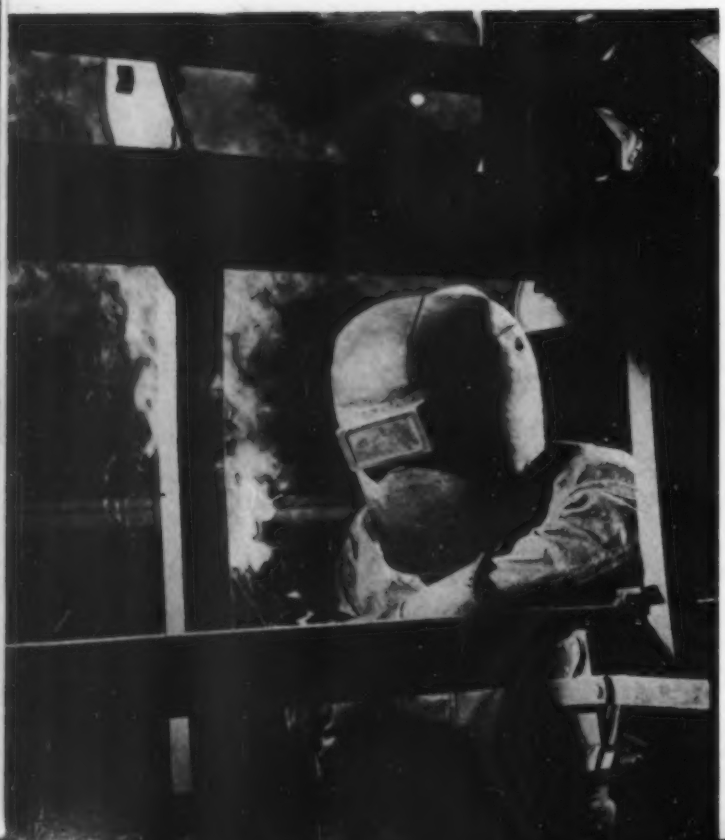
Livestock production, supplementing the primary cereal crops, brought $18,000,000 in sales and trades during 1939 and an estimated $48,000,000 in 1952. An additional $14,000,000 was received in 1939 by farmers in the province for dairy and poultry products. Farmers are expected to receive $46,000,000 for these products in 1952.

Vegetable crops have become an increasingly important crop in Manitoba. The income from the vegetable crop raised throughout the province in 1939 was about $2 million. In 1952 it is estimated at $5 million. The increase was largely from increased acreages of canning crops—particularly corn, peas and beans.

Timber has been the second most important resource in the development of Manitoba and provides the raw materials for the prov-

Ladling molten aluminum which is to be poured into dies to produce castings for electrical equipment. Aluminum die-cast products made in Manitoba are sold in Canada, the United States and South America.





Buses built in Manitoba find a ready market in both Eastern and Western Canada and Europe as well. Shown above are buses on a production line being fitted with component parts also manufactured or fabricated in the same plant. These include doors, windshields, sign boxes, and ornamental trim.

An electric welder welds the upper section of a bus frame in a master revolving jig. Upper and lower sections of the bus body travel through various stages of assembly from the master jigs and converge at the centre of production where they are welded together to form a single integral unit of latest design.

ince's pulp and paper and lumber industries. The productive forest area is about 30,500 square miles. Value of forest production for the province in 1952 was estimated at $26 million of which almost half was accounted for by woods operations and the other half comprising the values in the first stage of manufacture into lumber and pulp and paper. Between 1930 and 1952 it is estimated a total of at least 1,262,793,000 f.b.m. of lumber was manufactured in the province.

Mining of mineral resources has been an important activity in the province for over 20 years. Copper, gold, zinc and silver figure prominently among the metals; gypsum and salt among the industrial minerals, and cement among the structural materials. The province is the major producer of bentonite in Canada. In the period 1932-1952 it is estimated that the province's mining industry has produced over $348 million of metals and industrial minerals.

The wildlife and fisheries of Manitoba constitute natural resources of great value to the province. The commercial value of furs produced in the province for 1952 is estimated at approximately $4,300,000 as compared with $1,269,430 in 1939. The fisheries of the province rank among the most extensive inland fisheries in the world and last year their value totalled $7,644,503.

Of the three prairie provinces Manitoba is the most abundantly endowed with water-power resources. Several of these water-powers have been developed, notably on the Winnipeg River, which have proved of vital importance to the industrial expansion of the province. Six sites on the Winnipeg River have been developed, although one of these is now out of operation, and plans are underway to develop the last remaining site at MacArthur Falls. At the present time the total turbine capacity installed in Manitoba is 716,900 horsepower. The total power possibilities of the province at known undeveloped sites at ordinary minimum flow is 3,105,300 horsepower and at ordinary six-month flow 4,485,200 horsepower. The figures for horsepower are calculated on the basis of 80 per cent efficiency.

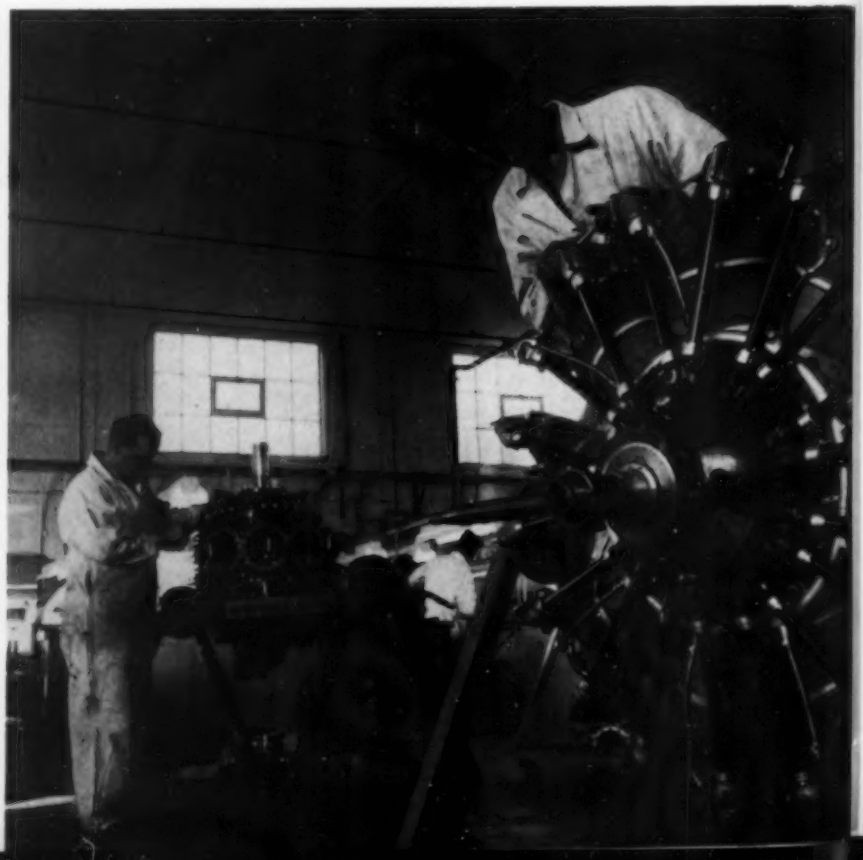
Estimates have been made of the extent to which the resources of Manitoba are turned into manufactured or semi-manufactured goods by raw material industries. Of the millions of bushels of wheat grown each year in Manitoba about 120,000 tons are used by local flour millers. Very little wheat is shipped into Manitoba for milling because all types of wheat required by millers are found within the area. Less than 15,000 tons of oats and smaller amounts of barley, rye, meal grains and concentrates are used by Manitoba millers. Almost two million barrels of wheat flour are produced annually in the province as compared to some 40,000 barrels of whole wheat and graham flour. Production of breakfast foods and stock and feed products are in excess of 20,000 tons per year.

The slaughtering and meat packing industry is the largest of any of the industries based on the raw materials of the province. Greater Winnipeg is the second largest packing house centre in Canada and is the principal processing centre for Western Canada. Of the cattle produced in the province, only a little under a third is consumed in the prov-

Interior view of newly constructed Pine Falls power plant which has added 114,000 horsepower to Manitoba's power output bringing the total to approximately 665,000 horsepower.

A modern machine shop. In the foreground an automatic boring machine is being used for the line boring of bushings in a link rod from a Pratt & Whitney engine. Special sizes of bushings, studs and guides for use in the overhaul of aircraft are also manufactured in this shop.

ince. It is estimated that about 45 per cent of the veal produced is consumed in the province and about 65 per cent of the pork. In 1951, 283,287 cattle were received at public stockyards in Manitoba or shipped directly from country points to packing plants in the province. Of this total only 149,206 cattle, or 53 per cent, were of local origin. Saskatchewan shipped 126,618 to Manitoba, and the remainder were from Ontario and Alberta. It is estimated that 60 per cent of the cattle processed in the province are of local origin. Of the 480,822 hogs slaughtered in Manitoba in 1951, 60 per cent were of



Final stages of assembly of an aircraft engine. In this plant which is the most modernly equipped overhaul engine plant in Western Canada engines are completely stripped down, cleaned, sand blasted and reconditioned.

local origin. The remainder were made up largely from hogs originating in Saskatchewan. Almost 60 per cent of the 44,831 sheep and lambs received at public stockyards or shipped directly to packing plants were of local origin. These figures indicate then that Manitoba receives and processes large numbers of animals from other provinces.

Vegetable processing is an industry which has developed rapidly in the past five or six years. It is based on the field vegetables grown in the Red River valley, Pembina Triangle, Portage Plains, and Brandon and Dauphin areas. About 44 per cent of the value and 71 per cent of the tonnage of the total pack vegetables sold in the Winnipeg area are grown in the province. Other markets for Manitoba market gardeners include Saskatchewan and Northern Ontario as far east as the head of the Lakes. Although reliable statistics are not available, there is no doubt that the major portion of canned vegetables consumed in the province is still shipped in from other provinces.

There are sixty-eight creameries in the province and twelve of these distribute fluid milk for local consumption and eleven manufacture ice cream. Eight cheese factories are also located in the province. Manitoba creameries produce approximately 23 million pounds of butter annually and about 1½ million pounds of cheese. Approximately 40 to 45 per cent of all creamery butter manufactured is shipped out of the province. About 15 per cent of the cheese produced is also exported although the province is a net importer of cheese products.

The principal basic products of the timber and timber products industries of Manitoba are pulpwood, lumber, fuelwood, building products, poles, post and mine timbers. Approximately 85 per cent of all green timber felled in the province is locally consumed. The greatest local consumption is for pulpwood which accounts for nearly 110,000 cords annually. Last year a little over 120,000 cords of pulpwood were exported to the United States and a further 50,000 cords were shipped to Ontario for manufacture. Less than 15 per cent of newsprint manu-

Machining portions of metal-stamping dies required in the production of parts for small circuit breakers for panel boards.

Packaging salt in the only modern salt plant in North America which uses natural brine pumped directly from nature's subterranean reservoirs. Using a full scale vacuum-pan process this rural Manitoba plant can produce one hundred tons of salt per day.

Checking a sample of refined oil in the refinery of Canada's only sunflower seed extraction plant located in Southern Manitoba. To ensure quality production tests are made every few hours to check for the amount of sediment in the crude oil, the acid and colour stability of the refined oil.

factured in the province is used locally and the balance is shipped to middle-western United States and the other prairie provinces. Manitoba timber is used in the manufacture of secondary products such as boxes, millwork, caskets and furniture. A good proportion of these products, in turn, are marketed outside the province. The extent to which any of these manufactured wood products is "exported" varies with the product. Most of the box shook manufactured in the province is used in the province, especially for packing butter, fish and meat packing products. A good proportion of millwork products are used locally although a substantial number are also shipped out of the area to Saskatchewan and northwest Ontario.

Copper is exported out of the province as blister copper which is only one step away from the final stage of electrolysis copper. In this final stage—which is carried out in Eastern Canadian refineries—gold and silver is also taken out. Zinc is sent out of the province as electrolysis zinc which is the purest form — often referred to as premium zinc. Two-thirds of the province's zinc production is exported to the United States and the United Kingdom and of this total over one-half is sent to the United States. Gold from the gold mines is shipped out as bullion to the mint.

Manitoba has Canada's second largest inland fishery and last year's production amounted to over 35 million pounds. Pickerel, whitefish, sauger, pike and tullibee are caught in the largest quantity. Over 90 per cent of the province's fish production is exported to the United States. About one-fifth of the fish caught in the province are filleted or smoked and the remainder is sold as fresh fish.

The fur industry is the province's oldest commercial activity and the fur resources of the province are still a valuable contributor to the provincial economy. In the 1951-52 season over 1,200,000 pelts were taken from the wild and fur farms in the province. Squirrel, muskrat, mink, weasel and beaver make up a large percentage of the total. Winnipeg is the fur centre of Western Canada and is surpassed only by Montreal as a fur centre in Canada. Besides the pelts produced in the province, large numbers of furs are received in Winnipeg from other provinces. In Winnipeg, pelts are either processed at one of the numerous fur establishments, exported by local dealers to other parts of Canada, the United States, or even Europe, or are put on sale at a fur auction where buyers from all over the continent attend. In 1951-52, 1,892,213 pelts valued at $9,278,432 were exported from Manitoba; 906,316 pelts valued at $1,501,521 were processed in the province so that in all, furs worth more than $10,700,000 were handled by dealers in the province.

Figure 1 portrays the importance of raw-material-oriented industries and market-oriented industries in Manitoba as measured by the number of employees in these industries in 1950. Figure 2 on the following page shows the relative importance of raw-material-oriented industries and market-oriented industries as measured by gross value of production.

Market-oriented industries employ the largest proportion of individuals in manufacturing in Manitoba, while raw-material-oriented industries employ the rest. It might be mentioned that the pattern indicated in Figure 1 is not peculiar to Manitoba alone but closely resembles the pattern for Ontario.

It will be noted that the five raw-material-oriented industries as a group employed, in 1950, 24.4 per cent of all the people engaged in manufacturing in the area. Of the raw-material-oriented industries, those based on the livestock resources of the area were by far the most important in terms of number employed and were followed by non-ferrous

Fig. 1 Employment in Market-Oriented and Material-Oriented Industries in Manitoba

Explanation:

A. Material-Oriented Industries

1. Food and Beverages including butter and cheese; feed and flour mills; slaughtering and meat packing; breakfast food, macaroni; malt and feeds; and misc. foods.
2. Fur dressing and dyeing.
3. Wood products, except furniture; pulp and paper.
4. Non-ferrous metal products.
5. Non-metallic mineral products except glass and monumental stone.

B. Market-Oriented Industries

1. Food and Beverages including bread, biscuits and confectionery; fruit and vegetable preparations; breweries and aerated waters.
2. Leather products; textile products and clothing (textile and fur).
3. Furniture and Paper products.
4. Printing, Publishing, and Allied Industries.
5. Iron and Steel Products.
6. Transportation Equipment.
7. Non-ferrous metal products and Electric Apparatus.
8. Petroleum, coal and chemical industries.
9. Misc. industries.

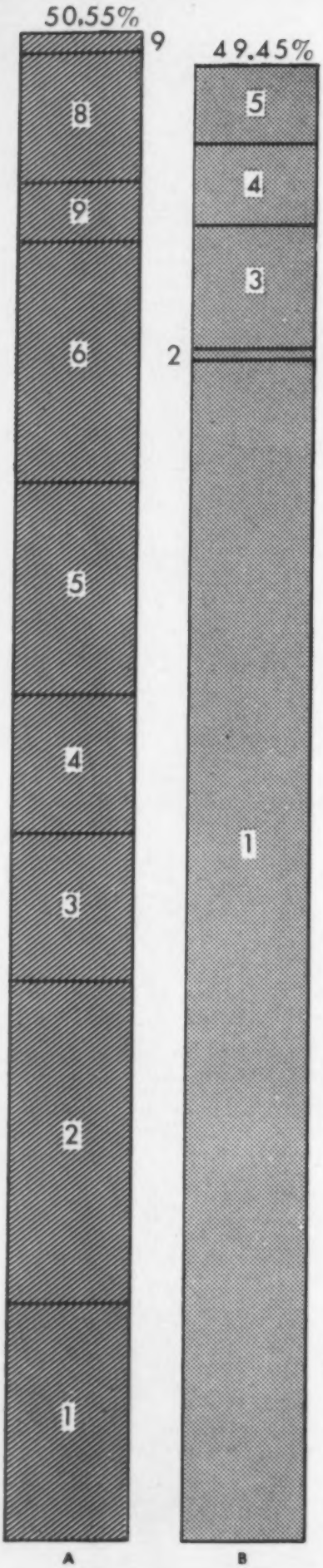


Fig. 2 Gross Value of Production of Market-Oriented and Material-Oriented Industries in Manitoba

Explanation:

A. Market-Oriented Industries

1. Food and Beverages including bread, biscuits and confectionery; fruit and vegetable preparations; breweries and aerated waters.
2. Leather products; textile products and clothing (textile and fur).
3. Furniture and Paper products.
4. Printing, Publishing, and Allied Industries.
5. Iron and Steel Products.
6. Transportation Equipment.
7. Non-ferrous metal products and Electric Apparatus.
8. Petroleum, coal and chemical industries.
9. Misc. industries.

B. Material-Oriented Industries

1. Food and Beverages including butter and cheese; feed and flour mills; slaughtering and meat packing; breakfast food, macaroni; malt and feeds; and misc. foods.
2. Fur dressing and dyeing.
3. Wood products, except furniture; pulp and paper.
4. Non-ferrous metal products.
5. Non-metallic mineral products except glass and monumental stone.

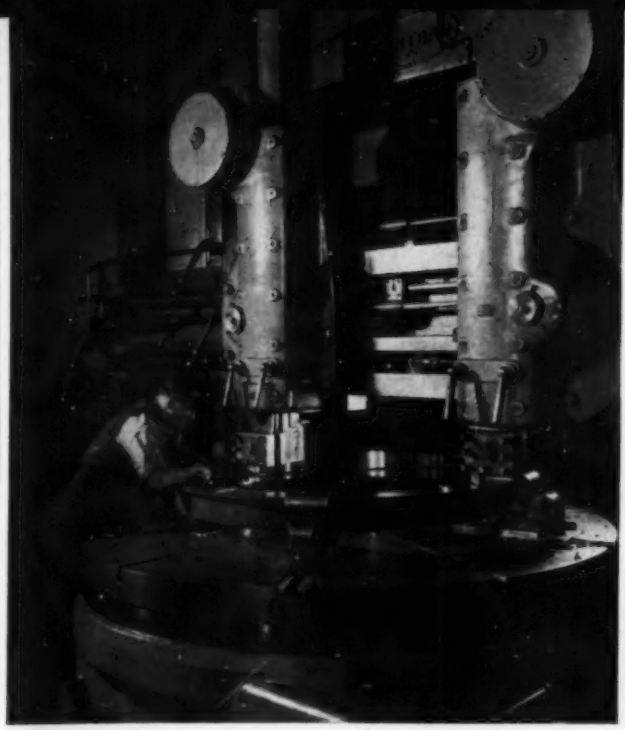
metals, butter and cheese, flour and feed, timber resources, and fish and fur resources in descending order.

Market-oriented industries locate near their principal markets because they require close contact with the expressed needs of the consumer or they require speed of delivery. By 1952, the Western Canadian market, which is the natural outlet for Manitoba's industrial production, consisted of 2,547,770 individuals who had, in the course of the year, spent on the average $882 per person for retail sales. Although the market was not heavily populated when compared to industrial areas in Eastern Canada, it did have a per capita retail sales figure above the national average of $783.

Although Manitoba still buys the bulk of its manufactured goods outside the province, about 75 per cent of all people engaged in manufacturing are employed in industries which can be considered market-oriented. These industries produce commodities primarily for the Western Canadian market although in recent years there has been an increased demand for Manitoba-made products from outside the province.

Market-oriented industries in the province fall into two categories: "consumer market-oriented" and "industrial market-oriented". Plants in the producers' goods industries have expanded considerably during recent years. About 30 per cent of persons engaged in market-oriented manufacturing are employed in the manufacture of equipment and supplies to be used in production. These include the manufacture of railway rolling stock, specialized types of farm machinery, mining and industrial machinery, and heavy electrical equipment. Consumer market-oriented goods include men's and women's clothing, food and kindred products, electrical appliances, furniture, printing and publishing, bakery products, dairy products, bricks and clay products.

Up to the present time neither fuel nor power has played an important part in influencing major industries to locate in Manitoba. Fuel affects the location of industries in much the same way as do other



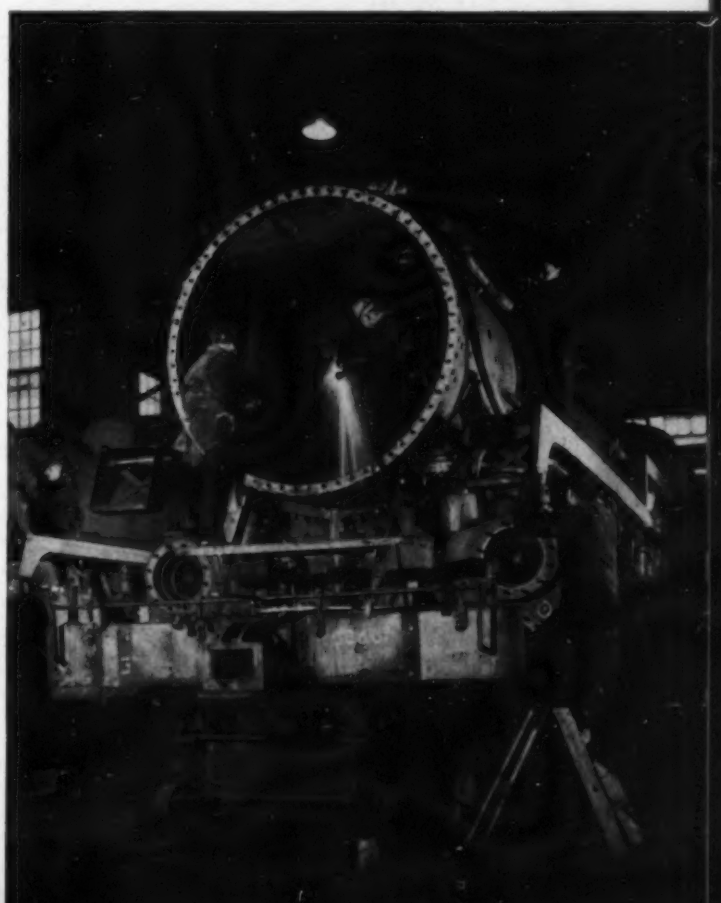
A machine operator in the famous Weston railway shops in Winnipeg is shown using micrometers to measure in .001 of an inch the inside size of a driving wheel type preparatory to having it heated before shrinking it in wheel centre.

material resources. Where the cost of a necessary fuel makes up a large part of the cost of producing a commodity, the industry involved tends to locate near the source of that fuel. Unlike other raw materials. however, fuels can often be interchanged, one type for another, since they do not actually enter into the composition of the final production. The loca'ional pull of fuel is lessened when there is a substitute—an industry using large quantities of fuel tending to locate in relation to the fuel that is cheapest and nearest to other factors which influence most the location of that industry.

Manitoba is relatively deficient in cheap fuels and is required to import most of them from outside the province. Wood has been available for use as a fuel but has not been a locational factor as such in any large industry. The piping of oil from Alberta to Manitoba refinery has improved the fuel situation and the position is expected to be bettered within the next two years when it is anticipated natural gas from either Alberta or Saskatchewan—or both—will be piped into the province.

Cheap electrical power is not an important locational factor except for those industries which consume an unusual amount of electrical power, such as electro-metallurgical and electro-chemical industries. As long as there is a dependable and continuing supply of electricity, the cost is not the primary locating factor for most manufacturing industries. Although electric power in Manitoba has always been reasonable in price and supply has been constant, it cannot be said to have played an important part in influencing any major industry to establish itself in the province. A number of industries using some quantities of electrical power in their operations have, of course, been established in Manitoba, but their location was the result of a combination of factors in which cheap power was not the primary one.

When an industry has high location costs and is not strongly tied to natural resources or markets, there will be a locational pull towards an area which has relatively low wage rates. An industry demanding specialized labour that is hard to train might also locate where there is already a supply of that type of worker. Labour-oriented industries have been relatively unimportant in



Engine of the "Mikado" class being prepared for a general overhaul. This shop employs 2,100 employees; has 284 acres of shop property; 40 miles of track and 26 shop buildings inside 3.12 miles of fence.

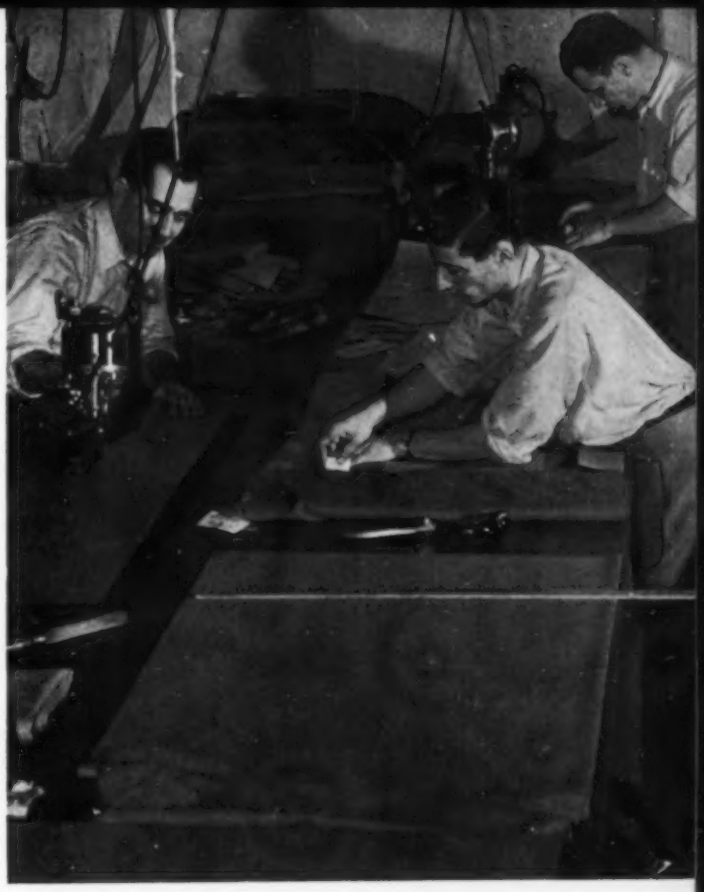
Over 300 woodworking firms in Manitoba produce such varied products as furniture, sash and door products, millwork, boxes and pails.

Manitoba, despite the fact that the province has the best strike record in Canada, a high rate of production per hour, and wage rates that are lower than those in other industrial areas in the country. It is equally true that no significant drawing power has been created so far through the development of a large labour group with a particular skill which might heavily influence the location of industries using the same or similar skills.

The growth of Manitoba in the industrial field in the past decade can be better understood after a brief review of some of the important characteristics of manufacturing in the province. The 1952 total of $630 million for gross value of manufacturing production was over four times the 1939 figure of $134,293,595. In the same period, the number of manufacturing companies in the province has increased over 50 per cent and

Winding yarn from bobbins on spools. These spools of yarn, produced in Manitoba, will be used for making men's socks or skeined into 4-ounce skeins.

Winnipeg is one of the leading apparel centres in Canada and Manitoba garment workers have acquired a reputation for distinctive styles and excellent workmanship.



now totals approximately 1,650. Ten years ago manufacturing provided employment for less than 24,000 persons in the province. Today the number of employees directly employed in manufacturing total over 45,000, in other words almost a 90 per cent increase. A number of fields have been characterized by a more than 100 per cent increase in production workers. For example, employment in the slaughtering and meat packing industry has increased 100 per cent since 1939. In the same period employment in the furniture industry increased 328 per cent; in the electrical apparatus industry 408 per cent; in the sheet metal products industry 140 per cent; in the primary iron and steel industry 130 per cent; in the petroleum products industry 180 per cent, and in the agricultural implements industry over 400 per cent.

Carding wool in a textile plant in rural Manitoba. When the wool is taken off the carding machine it will be spun into yarn on a spinning mule.

Final assembly of a 4,000 K.V.A. transformer for use by a Western Canadian utility.

Although Manitoba manufacturing is highly concentrated in the Greater Winnipeg area, the past decade has been characterized by the development of manufacturing industries in rural areas. Manufacturing operations are now carried out in over 150 centres in the province.

Another characteristic of manufacturing is the extreme range in size of plants in the province. There has been a tremendous increase in the number of small manufacturing businesses which have commenced operations since the end of the last war. The importance of these small businesses in the economy of the province is evidenced by the following table:

No. of Employees in Manitoba Manufacturing Firms

Employees	*No. of Firms*
0–15	1,207
16–25	100
26–50	126
51–100	92
101–250	72
251–500	19
501–1000	13
Over–1000	3

As indicated above, there are 1,207 manufacturing firms that employ less than 15

Pictured is a high-speed friction saw cutting tubular steel sections in a modern metal fabricating plant. This machine can cut through alloy steel sections in a matter of seconds.

persons. The type of manufacturing in which these firms are engaged is shown below:

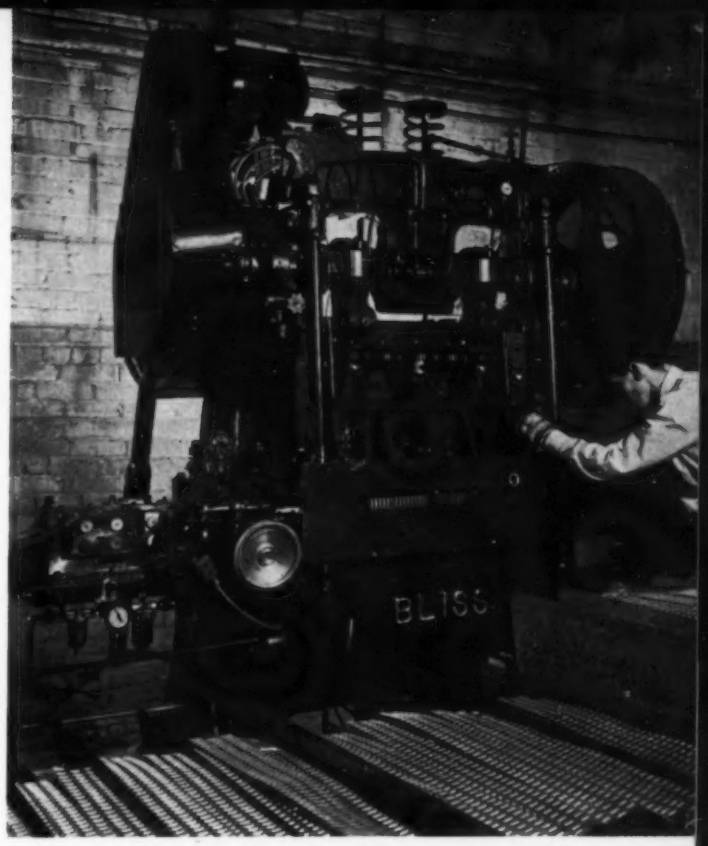
Manitoba Firms Employing Fifteen or Less Employees

No. of Firms	*Percentage*	*Type of Operations*
381	31.5	food products
198	16.4	metal working
174	14.4	wood working
195	16.2	textile
84	7.0	paper and related prod.
175	14.5	miscellaneous

One of the factors which has aided the expansion of Manitoba manufacturers between 1940 and 1952 has been the increased demand for its products by buyers from outside the province. Less than 45 per cent of Manitoba firms produce only for the provincial market. About 35 per cent sell their products in Western Canada and approximately 20 per cent sell in the Canadian market from coast to coast. Nearly 60 firms in the province export outside of Canada.

A heavy capital investment program has been equipping Manitoba for its new industrial role. Since 1948 alone it is estimated that there has been spent in the province approximately $75 million on new capital goods for manufacturing purposes.

While the expansion in plant facilities and growth in the value added by manufacture highlight the industrial development of Manitoba in the period 1940-52, it would be correct to say that one of the most important benefits probably was that derived from the broadening of skills and perspectives of workers and management. They have not only learnt the skills necessary to handle numerous operations and machines, but they have also acquired skills in precision work. The skills and habits of mind absorbed by the peoples of Manitoba during the last 10 to 12 years represent a most important element of the industrial expansion of the period—for upon these skills can be founded an industrial structure.



Top, right:—
An electrical, automatic, radiator core fin stamping machine stamps out radiator core fins in a Manitoba plant that produces heavy duty truck radiators and cooling units for diesel locomotives. (Right.) Forming flat bars into angle bars with a 200-ton press at a machine shop in southern Manitoba. The finished angle bars are used in the manufacture of agricultural specialty equipment made in the same factory.

Nothing is left to chance in making sure that dolls made in northern Manitoba are perfect in every detail. The firm making these dolls was formerly located in Austria. Their products are sold in Canada and the United States.

Over-all industrial production in Manitoba is today much more diversified, integrated, balanced and stable than ever before. Labour and management have acquired new manufacturing skills and experience. Production —that is, output per man—compares favourably with that of any other region on this continent. The province's labour force has proved it has ability and creativeness equal to that to be found anywhere else in the nation. Manitoba's record of peaceful labour-

Rolling steel at the 16-inch stands of the rolling mill located in Selkirk, 25 miles north of Winnipeg. Many varieties of steel shapes and forms are turned out at this mill for the bedding, hardware, agricultural implement and other steel fabricating industries throughout Western Canada. The construction industry and the railways are also large users of the products of this plant.

Stacking block salt for shipment to Canadian livestock farms. This stock salt is specially prepared with cobalt and iodine to aid the digestion of cattle and sheep. It is coloured either blue or red to distinguish it from pure salt.

management relations is unequalled anywhere else in Canada.

Manitoba manufacturers are now turning out goods equal in quality and competitive in price with those produced in the United States and other parts of Canada. Methods of production, distribution, and sales have been improved in recent years. Markets both at home and elsewhere have been developed. Manitoba manufacturers are proving that manufacturing in many fields can be carried

Skilled dairymen remove freshly churned butter from a 1,000-pound churn in a creamery in rural Manitoba. The butter is being placed into 90-pound boxes where it will be marked into 1 pound prints. Manitoba is noted for the high quality of creamery butter produced. In 1952 over 97 per cent of all Manitoba butter graded was first grade quality which is higher than for any other province in Canada.

out in the province on a fairly large scale and in competition with Eastern Canadian and American firms. Many examples can be given which disprove many of the things some people used to say about secondary industry's prospects in Western Canada.

For example, one of Canada's largest furnace manufacturing companies is located in the province and ships its products from coast to coast. Less than 12 per cent of its sales are in Manitoba. Five years ago this firm gave employment to less than six persons—it now employs 125.

It is a well-known fact that Winnipeg leads all other Canadian cities in gross value of production of men's work clothing. A fact not nearly so well known, however, is that the largest individual plants of the women's factory clothing industry are situated in Winnipeg. Manitoba's apparel industry has become the province's third largest manufacturing industry in terms of gross value of production. It now totals approximately $50 million annually.

It was a Manitoba firm that designed and now produces the world-famous scintillometer now used extensively in Canada, the United States, Australia and Europe. This same firm designed and put on the Canadian markets last year a new meter for testing moisture content in grain. Up until the time this meter was put on the market, former instruments required 35 minutes to complete the test and then had to be cooled before a second test was possible. The Manitoba-designed meter requires only 30 seconds per test and can be used in a second test immediately.

Less than four years ago, as a result of the Manitoba rural electrification program, a small firm started business in the province manufacturing electric transformers. In the first year they produced a total of 300 units —they now produce approximately 600 units a month.

A well-known Canadian automobile and tractor battery manufacturing plant has its headquarters in Manitoba and is said to produce a larger variety and selection of batteries than any other battery manufacturer in Canada. Last year, for example, they produced 175,000 units in Winnipeg for distribution between Fort William and Victoria.

Heat transfer units required by General Motors Diesel Limited of London, Ontario, are made by a Winnipeg firm. Until this firm started production, these units had always been imported from the United States.

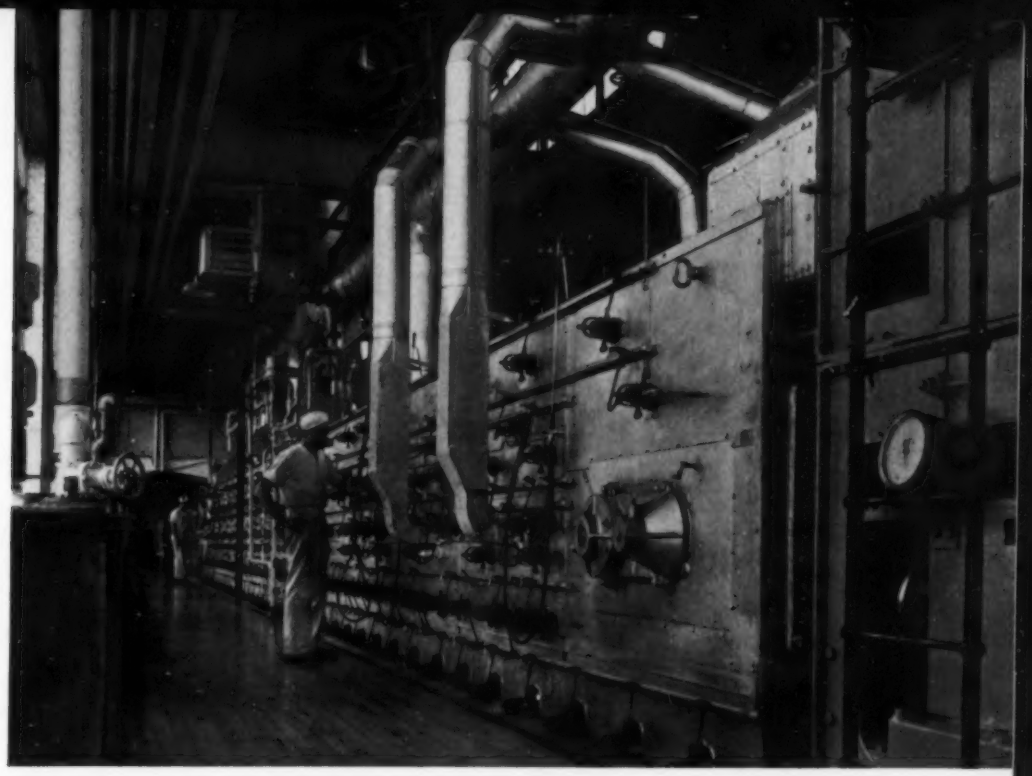
It is in Manitoba that a famous brand of flashlight and radio batteries are manufactured for distribution across Canada and for export to the Far East.

Winnipeg is the home of the firm that makes what is recognized as the best mechanical taxi meter on the Canadian market. This Manitoba-designed meter is also sold in Australia, Colombia and the United States.

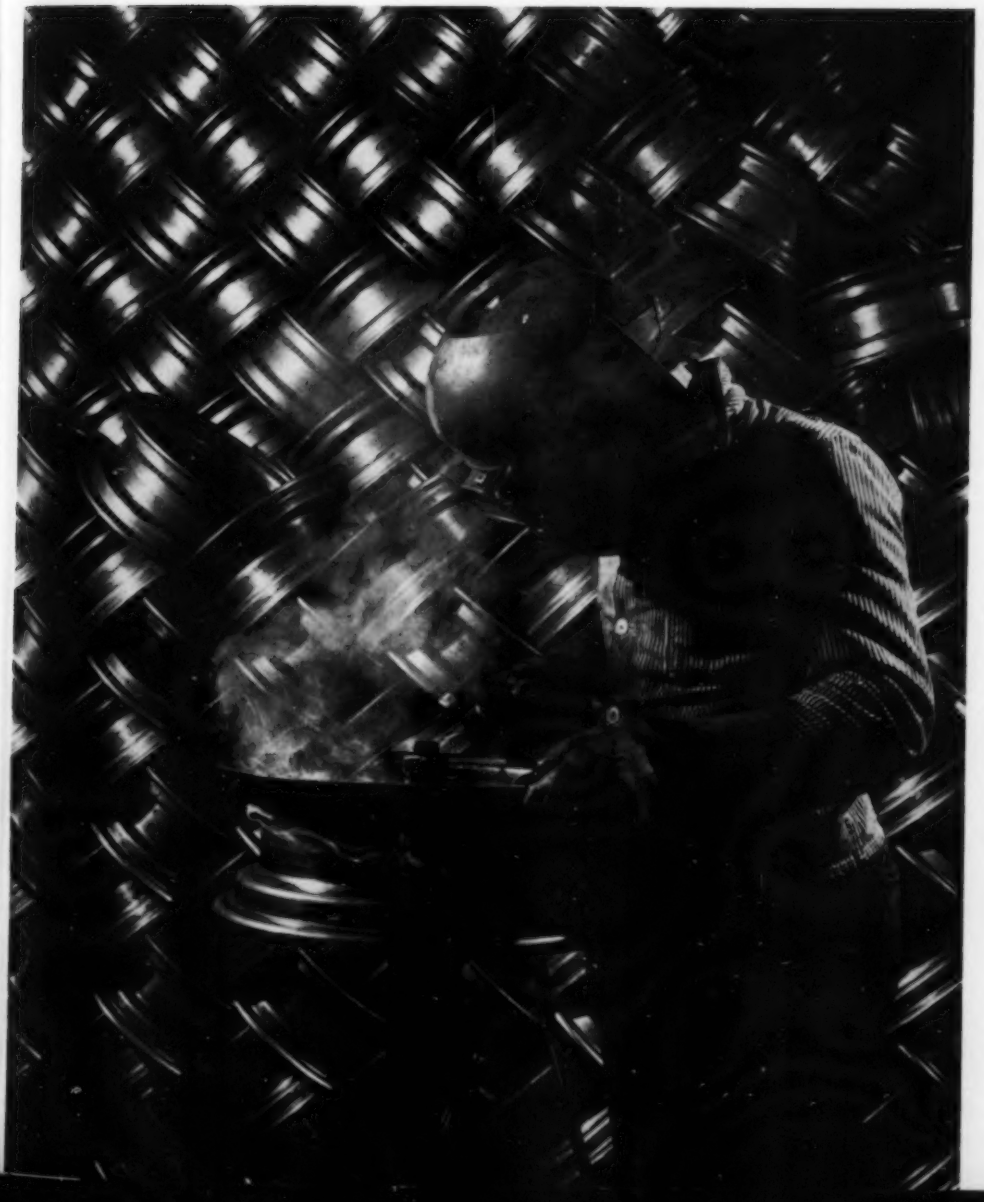
The largest pump manufacturer in West-

Aerial view of new $10 million catalytic oil refinery near Winnipeg which is now in operation and has a 10,000 barrel daily capacity.

Refining capacity in Manitoba is being increased rapidly and it is not inconceivable that within the next few years oil refining will become one of the province's leading industries.



An interior view of the Manitoba branch of one of Canada's oldest and leading biscuit manufacturers. Products from this factory are shipped to all parts of Canada.



An electric welder welds spokes and hubs to a special wheel rim used in the manufacture of portable grain loaders. In 1952 a total of 3,000 grain loaders as well as grain crushers and numerous related products were made in this factory located in rural Manitoba.

The Union stockyards at St. Boniface, which are the largest stockyards in the British Commonwealth. These yards have a capacity of approximately 14,000 cattle, 8,000 hogs and 2,000 sheep.

Inspecting choice beef in one of Manitoba's major packing houses. Winnipeg is the second largest packing house centre in Canada and the leading centre in Western Canada.

ern Canada is located in the province. This firm started operations ten years ago and today is one of the three companies in Canada producing pumps from the drawing board to finished product. The centrifugal and turbine pumps which they produce are mainly for export.

It is in Winnipeg that a well-known British firm assembles and services telephone equipment for all of Canada.

Continuous flow, high-speed laundry and dry cleaning equipment is manufactured in the province and sold in every part of Canada. A fact not generally known is that most of the aircraft floats used in Canada are manufactured in Manitoba and they are shipped to the United States, South America and Australia.

In a score of other industries a similar story could be told.

Another and most encouraging feature of recent years has been the ability of Manitoba companies to establish a market in the United States for component parts. The willingness of the United States business community to place orders with Manitoba manufacturers is very ample evidence of the confidence that they have acquired in the ability of Manitoba industry to produce and to be competitive.

The future of manufacturing in Manitoba depends, partly, of course, upon business conditions throughout Canada and the whole world. However, certain developments will probably occur.

The market-oriented industries as a whole will probably continue to dominate manufacturing in Manitoba for some years to come. There should be continued increases in population in Manitoba and Western Canada and consequently in the home market for Manitoba manufacturers. This increase in the Western Canada market will

An aerial view of a cement plant in Manitoba. Located near Winnipeg the plant has a capacity of 1,600,000 barrels annually.

stimulate market-oriented industries by making them less dependent on distant markets and by aiding them in establishing large-scale production. High transportation costs will thus be partly offset by large-scale economies, and Manitoba industries will find themselves in a better competitive position.

Market-oriented industries will continue in the future to develop with the area as they have done in the past. The food industries, printing and publishing, and the other industries which are directly tied to the consumer will expand as the population increases. The machinery and other metal industries which have for years served the area's industries by providing specialized machinery and parts, will expand and become more diversified as the area becomes more diversified. Since this expansion in market-oriented industries is expected to progress only with the growth of markets, the future development of these industries is likely to be even quicker than the very substantial growth which has taken place since the end of the war.

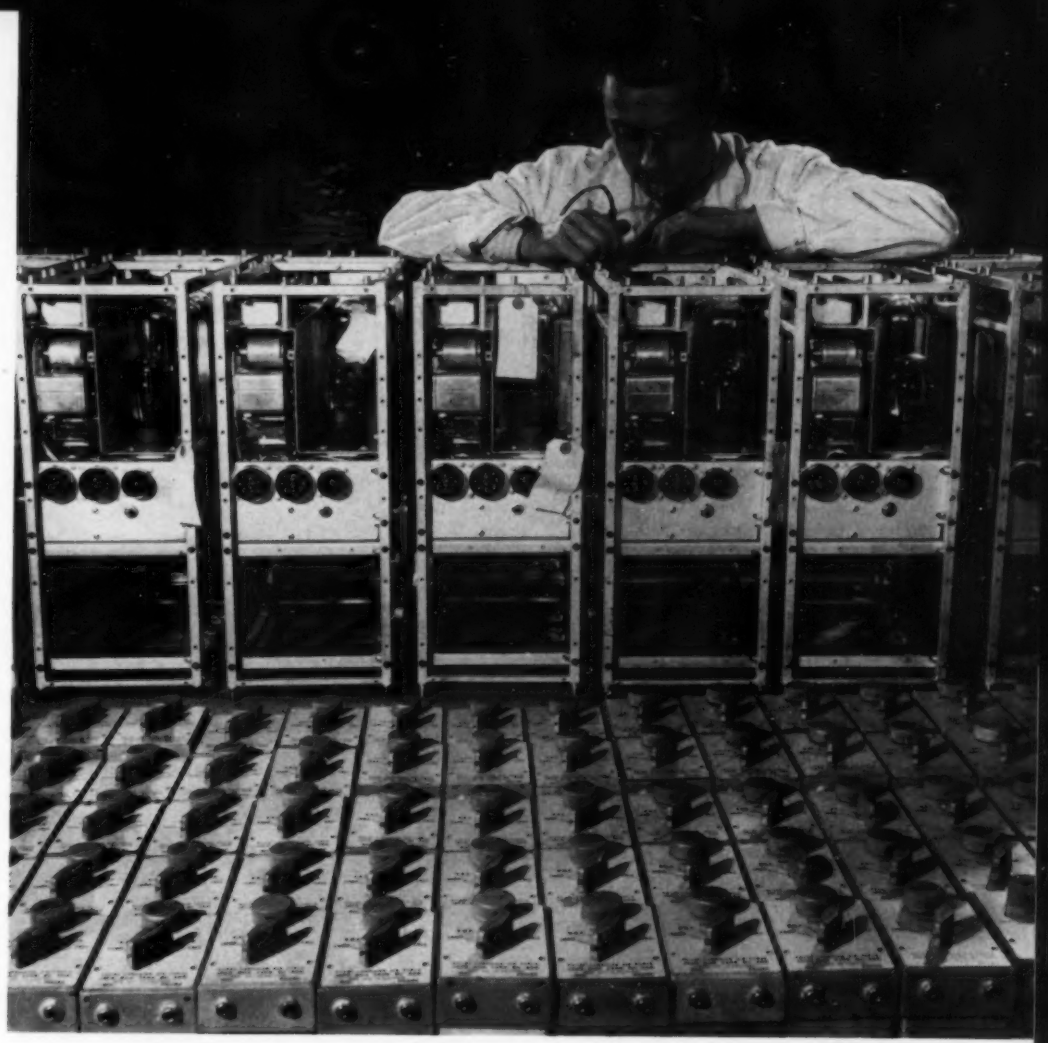
As well as an expansion of existing industries which have provided for some of the more immediate needs of the area for years, an enlarged market may bring other changes in market-oriented industries of the area. New consumer goods industries which have previously found the market too small to warrant locating nearby, may find it profitable to locate in Manitoba. For instance, new apparel, textile and leather goods industries may develop where before they have been relatively unimportant in the province.

Another development may be the expansion of some of the machinery and fabrication plants to the point where they can compete profitably with other areas and begin to ship more of their goods out of Manitoba. This trend, which has already begun in many of the province's metal fabricating and machinery plants, may be accentuated as the Western Canadian market, and therefore the possibility of larger scale production, increases. The products of these expanding plants will probably remain specialized and will build up outside markets by developing a specialized demand for their products.

The further development of farm electrification programs in Western Canada will result in the further building up of the province's appliance industries.

Manitoba is fast becoming an important refining centre and further substantial developments in this field can be expected in the very near future. Everyone agrees that the time is not far off when natural gas will be imported into the province and when that happens it will facilitate the introduction or expansion of many different industries whose growth in the region is economically

Rolls of newsprint manufactured in southeastern Manitoba are made ready for shipment to Canada and the United States.



The technician in the background is assembling and testing ground transmitters used by the Royal Canadian Air Force. In the foreground are completed reconditioned "Jack-Boxes" used for intercommunications on board aircraft. The manufacture, assembly and overhaul of scientific and electronic equipment is a relatively new field in Manitoba but is growing very rapidly.

possible. It may well be that the availability of economic natural gas in this province could be responsible for the development of brick, pottery, and ceramic industries, textile dyeing, porcelain enamelling and the fabrication of plastics, metals and other materials.

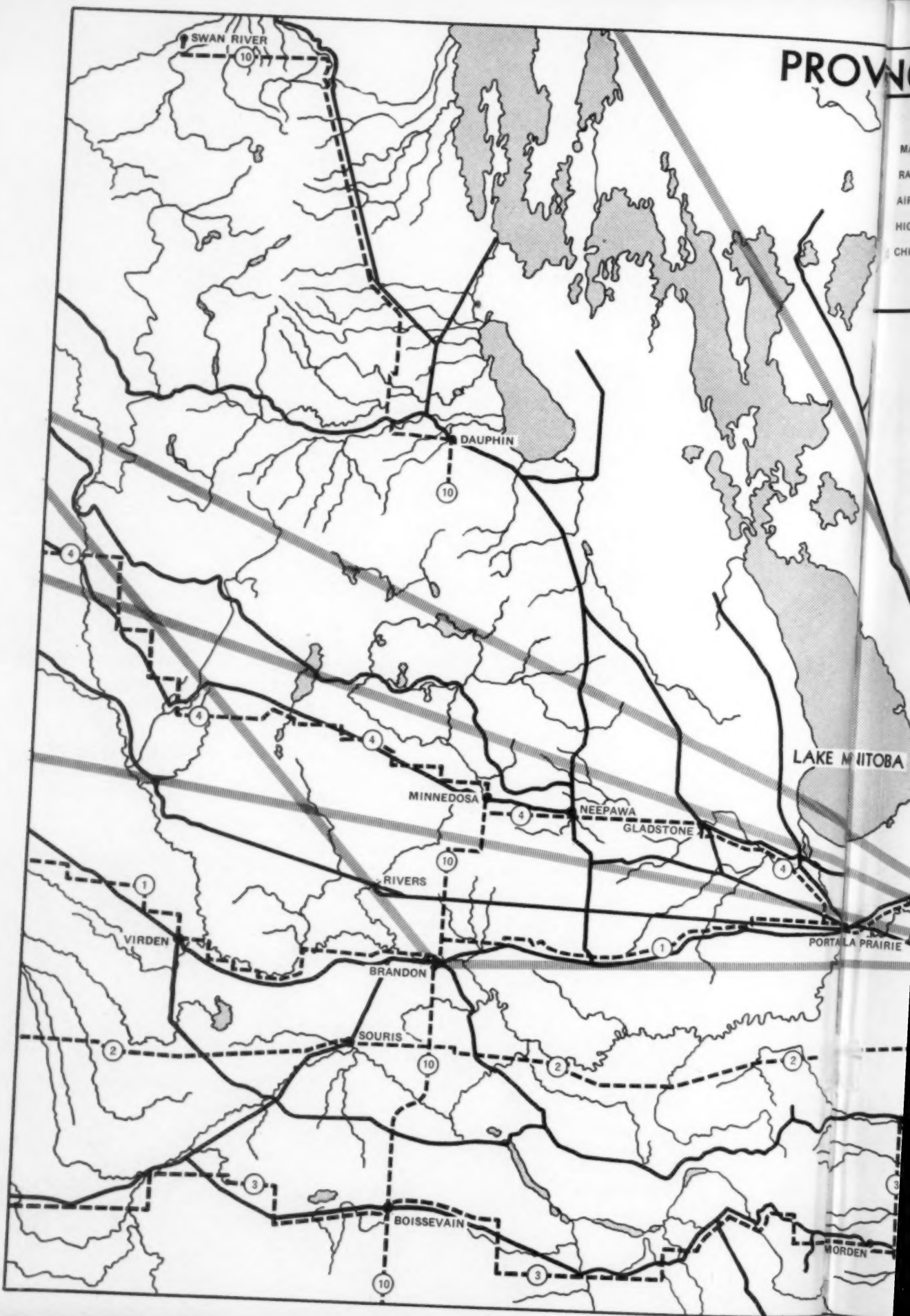
In the next few years raw-material-oriented industries can be expected to show an even greater increase proportionately than the market-oriented industries of the province.

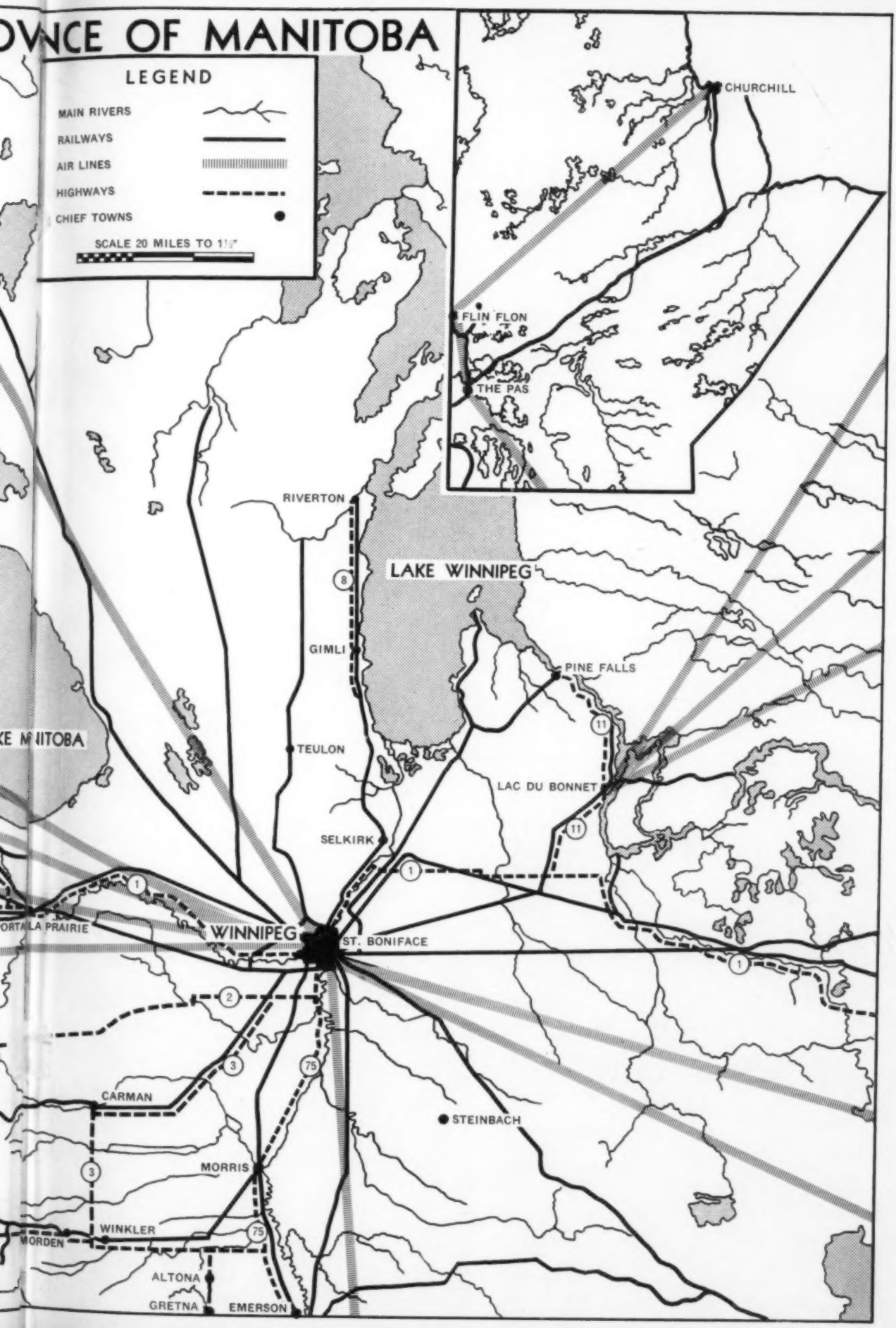
Meat packing and flour milling will probably increase only slightly in the future. Vegetable processing will continue to expand as will cheese, dried milk and butter production.

Logging, sawmill and planing operations can be expected to show slight increases. A substantial increase in the manufacture of finished wood products and the utilization of waste can confidently be predicted for the province. Expansion of pulp and paper in Manitoba can also be expected. Employment in all wood-using industries, therefore, should increase in the next few years.

Although there has been an expansion of mining in Manitoba, refining and smelting facilities are not expected to show any substantial increase in the immediate future. Smelting and refining of non-ferrous metals in Manitoba are, therefore, expected to remain on much the same level as they are now.

With the further opening up of new areas in Northern Manitoba, production of commercial fish will be increased and it is to be expected that more fish will be filleted and smoked in the province before being shipped to outside markets.


SWAN RIVER
DAUPHIN
MINNEDOSA
NEEPAWA
GLADSTONE
RIVERS
VIRDEN
BRANDON
PORTAGE LA PRAIRIE
SOURIS
BOISSEVAIN
MORDEN


OVNCE OF MANITOBA
LEGEND
MAIN RIVERS
RAILWAYS
AIR LINES
HIGHWAYS
CHIEF TOWNS
SCALE 20 MILES TO 1"
CHURCHILL
FLIN FLON
THE PAS
RIVERTON
LAKE WINNIPEG
GIMLI
PINE FALLS
TEULON
LAC DU BONNET
SELKIRK
WINNIPEG
ST. BONIFACE
STEINBACH
CARMAN
MORRIS
WINKLER
MORDEN
ALTONA
GRETNA
EMERSON
8
11
1
2
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75

Tapping a 20-ton open hearth furnace in a Manitoba steel mill.

Portion of a calibrating board, used to calibrate th tured by a Brandon

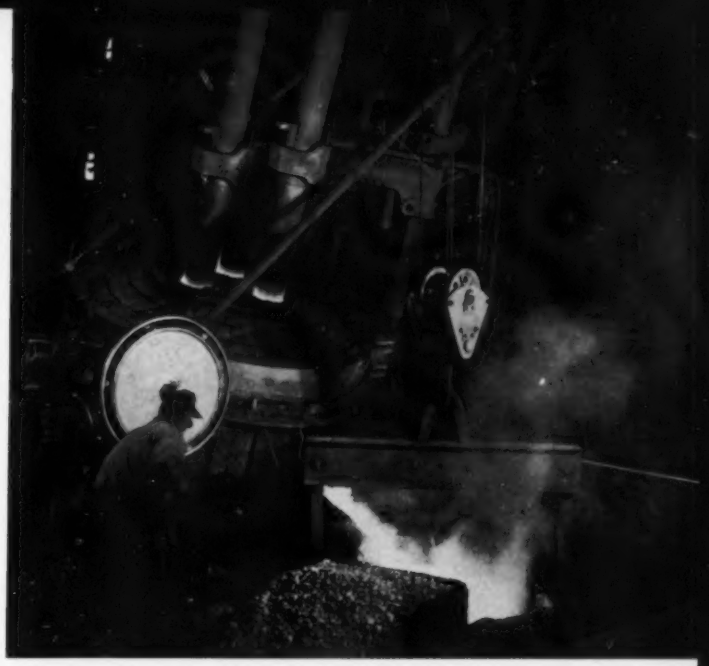
Among the numerous factors contributing to the rapid industrial growth of Manitoba is the favourable attitude taken by both the government and the people of the province. The government recognizes the importance of industry to a well-balanced stable economy and maintains policies conducive to the development and encouragement of industries within its borders. Manitoba laws and regulations have been consistently favourable to business enterprise and are specifically designed to permit industry to develop freely, as indicated by the fact that the Manitoba per capita direct provincial taxes are the lowest of any province in Canada.

Manufacturers looking to Western Canada for trade or the establishment of branch plants have available to them the services of the provincial Department of Industry and Commerce. Created several years ago to assist existing and new business in the province to prosper the department, without charge, is willing and anxious to assist manufacturers in a number of ways. Confidential reports and special studies are made for manufacturers considering the possibil-

Automatic coil winding of transformer coils. There are relatively few machines of this type in Canada.

Making final adjustments in a spinning wheel manufactured in a factory located in rural Manitoba.

to cali brate the totalizing circuit breaker manufac-d by a Brandon firm.



A 3-ton-per-hour electric melting furnace in operation in the production of rolled steel products in Manitoba.

ities of locating in Manitoba giving detailed information on such factors as markets, taxation, power, labour, sources of raw materials, availability of buildings, transportation and other locational factors.

Firms anxious to contact suitable local manufacturers to have their products partially or wholly manufactured or assembled on a sub-contract or a manufacturing licence basis have found that this provincial agency can effectively assist them in contacting the suitable manufacturers in the province. Manufacturers have found that this procedure has many advantages in that it saves time in getting production started and enables them to capitalize on the goodwill of established Manitoba manufacturers already serving the Western Canadian market.

Sales agents in Manitoba are obviously in an excellent position to service the Western Canadian market and can frequently service the whole of Canada. The provincial Department of Industry and Commerce also assists manufacturers in locating suitable field agents or agencies in the province. Businessmen visiting or writing to the

Trimming and assembling of collars for the manufacture of Manitoba-made grain loaders for Canada and the United States.

Assembling furnaces for distribution to all regions of Canada. Less than 12 per cent of this firm's output is sold in Manitoba.

Manufacturing the specialty fuel known as Pres-to-logs. This fuel in the form of a log, four inches in diameter and 12½ inches long, weighing about 7½ pounds, is made by compressing sunflower seed hulls. Final stages of the process exert pressures up to 165,000 pounds per square inch. With those large pressures no binder is necessary so that the resulting fuel, which is 2 or 3 times as dense as wood is also clean to handle. Pres-to-logs have a b.t.u. value of approximately 8,100 per pound.

Department will find that it serves as a clearing house for economic data about the province and its various commodities.

The developments in manufacturing in Manitoba during the next decade or two will probably not be very different from those already started, although they probably will be even more rapid than those which have taken place since the end of World War II. Increases may be predicted for raw material and market-oriented industries. A greater diversification of industries is also quite probable. The future for manufacturing in Manitoba appears bright.

Aerial view of downtown business section of Winnipeg, the major manufacturing and distributing centre of Western Canada.

Map Changes Caused by Glaciers

by L. G. TEMPLE

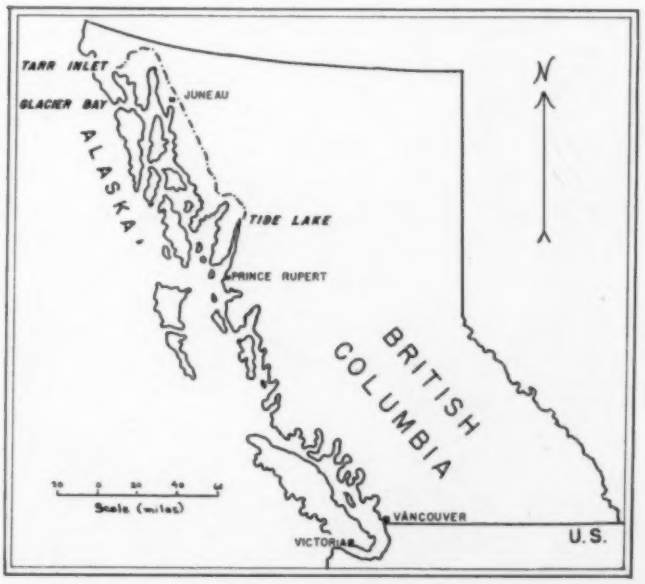
THE layman tends to think that once an area is mapped, the map can be used indefinitely; certainly for many years. Cartographers, on the other hand, realize that maps must be continually revised, owing to the addition or disappearance of roads, buildings, dammed streams and other man-made features. Few people know, however, that natural features of considerable size sometimes appear and disappear, without man's assistance.

During the present century two important changes in the map of British Columbia have become necessary owing to the recession of glacial ice. It has been known for years that most of the province's glaciers are receding. Recession takes place when the amount of ice melting at the toe of the glacier exceeds that supplied from the icefield. This is influenced by climatic conditions, rate of precipitation and length of periods of sunshine. It is known that the climate of northern Canada is gradually becoming warmer and the amount of ice covering the arctic and mountain areas is decreasing. Investigations into the rate of flow and the amount of recession have been made since 1887 on the Illecillewaet Glacier, in the Canadian Rockies.* The most striking case, however, is the withdrawal in the Alaska panhandle of the ice around Glacier Bay.

When Captain Vancouver sailed up the west coast of British Columbia in 1794, charting the waters as he went, there was no Glacier Bay. Instead he shows a shoreline of solid ice. A hundred years later, when the Alaska Boundary Commission surveyed the boundary around the bay, keeping it back from salt water as provided by the treaty, the irregularly shaped inlet was over sixty miles long, and at its northern extremity was within twelve miles of the boundary.

Then, in the twenties, Constable Harper-Reed, in charge of the Boundary Detachment of the B.C. Provincial Police, reported that at the head of Tarr Inlet a strip of flat land half a mile long and five hundred feet wide bordered a deep-water harbour more than half a mile inside the Canadian boundary! At that time, Stewart, at the head of the Portland Canal, was thought to be the northern terminus of salt water on Canada's Pacific coast. The new find was considerably north of Juneau, Alaska's capital city, since it was over 500 miles west and nearly 700 miles north of Vancouver.

J. P. Forde, district engineer from Prince Rupert, was sent to inspect the area for the government, and confirmed the constable's findings. He stated that docks for the largest vessels could be built close to shore without fear of ice damage, as ice has never formed on the inlet since it was freed by the recession of the Grand Pacific Glacier. Thus Canada acquired a harbour the existence of which had never been suspected, for when



*See Glacier Observations in the Canadian Cordillera, *Canadian Geographical Journal*, November, 1948.

the boundary was surveyed all of Tarr Inlet was covered by the glacier.

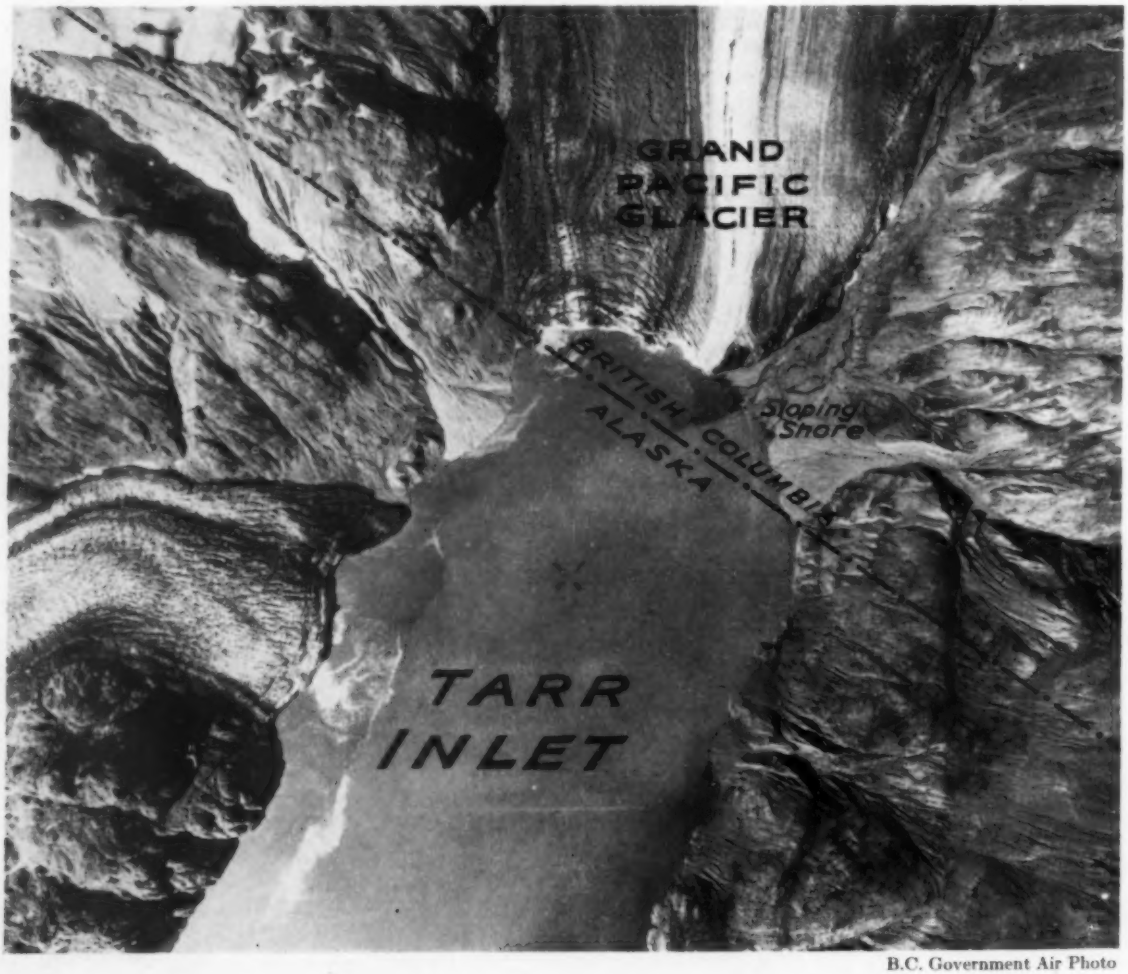
This, of course, meant that all the maps had to be changed; showing the mainland of Alaska as a continuous stretch of land was wrong. Tarr Inlet cut off the panhandle from the rest of the territory, and the Alaskan maps, as well as those of Canada, were altered.

No sooner had the maps been brought up to date in that respect than the cartographers had to make more alterations. When the Boundary Commission surveyors ran the boundary between the panhandle of Alaska and British Columbia, they mapped also the area for 15 or 20 miles each side of the border. Some 25 miles north of the end of the Portland Canal they found a lake four miles long and about three-quarters of a mile wide, shut in by timbered shores which rose steeply to snowcapped peaks. The streams that fed the lake were glacial, the largest being a small river that ran into its southern end. This creek was the outlet from Summit Lake, two miles farther south and two hundred feet higher.

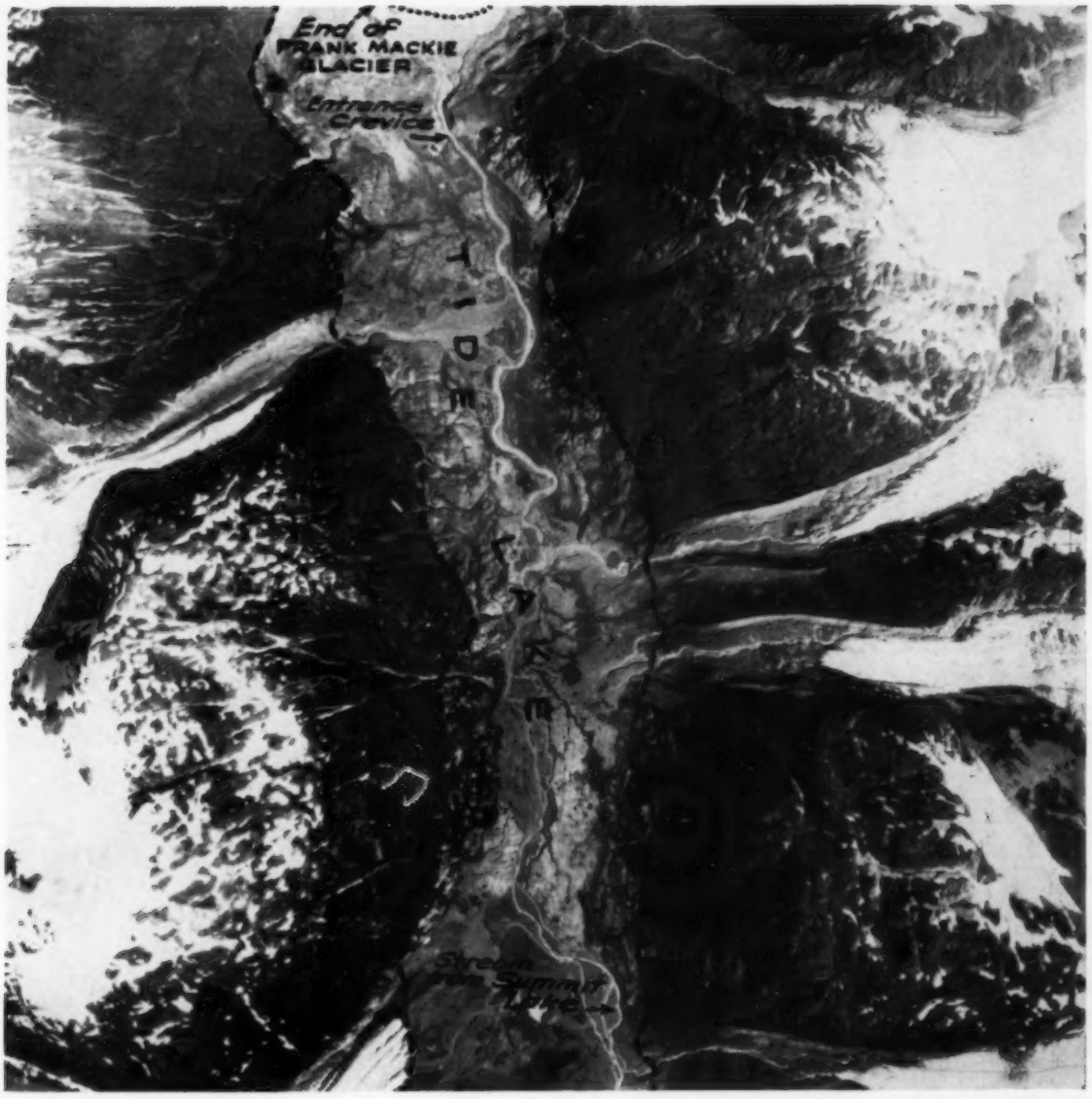
During the summer months, it rose and fell every day, as, being almost entirely glacier fed, the incoming water increased all day as the sun thawed ice and snow on the peaks and decreased steadily all night as the sources froze. As this steady and regular rise and fall resembled the action of the ocean tides, local prospectors and trappers had called it Tide Lake.* This name was approved by the Dominion authorities and it was designated on the maps of the region.

The northern shore was formed by the projecting end of the Frankmackie Glacier, and the overflow ran around this glacier tip and flowed in a tempestuous stream to Bowser Lake, over a thousand feet lower. The rapid rise and fall of this river caused

*See Exploring in the Coast Mountains, *Canadian Geographical Journal*, August, 1950.



B.C. Government Air Photo



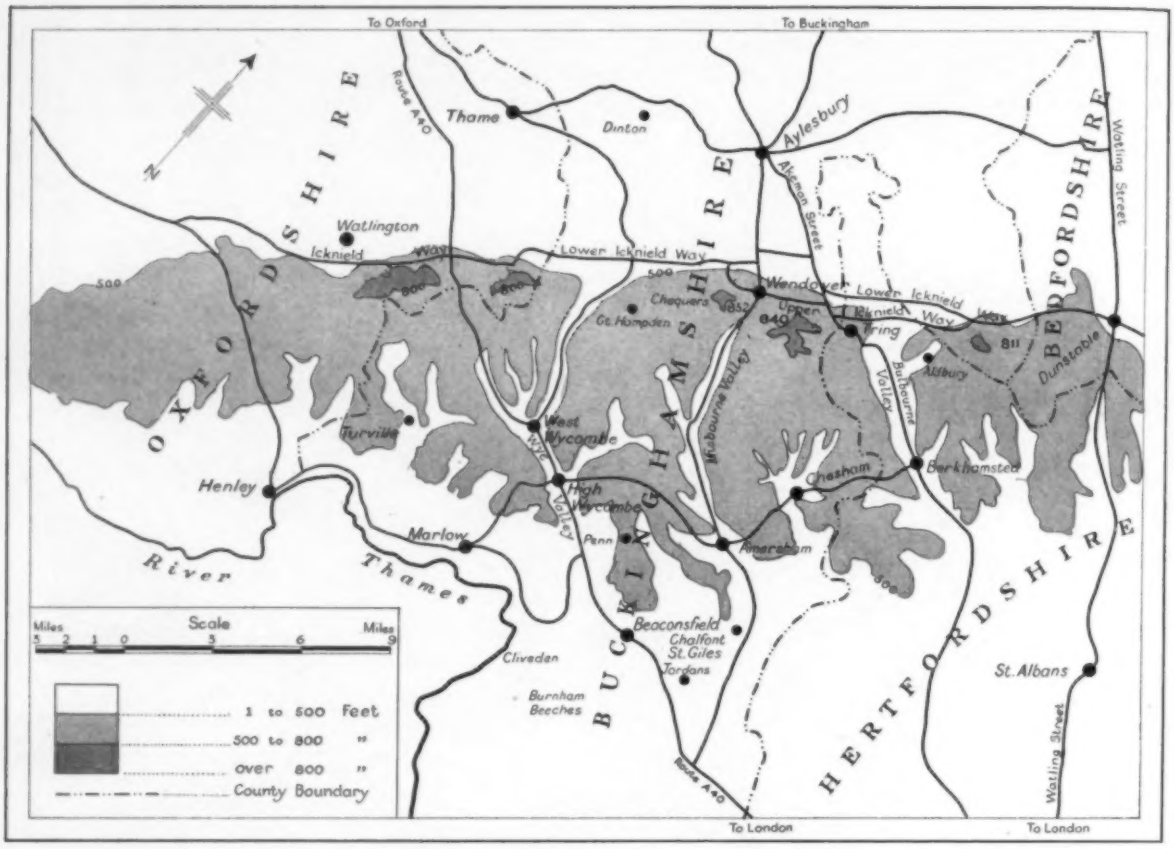
R.C.A.F

the water level of Bowser Lake also to vary considerably. It has been known to rise as much as nine feet in a few hours during the spring thaw.

Some time in the late twenties the Frankmackie Glacier receded enough to uncover a crevice in the rock beneath it, and the water, under tremendous pressure two hundred feet below the surface, forced out the gravel and dirt which the crevice contained. Whereupon Tide Lake drained from the bottom, just as a bathtub does when you pull the plug! It is said by people in Stewart that a prospector was camped on the shore when it happened, and that he stated the lake was completely drained in less than twelve hours.

In the accompanying air photograph the cleft in the bottom where the water ran out is clearly shown. The former shores are well defined by the abrupt cessation of thick timber: the small trees that can be seen growing in the former bed have sprung up since the water left. The stream from Summit Lake can be seen winding through flats of glacial silt deposited while the lake still filled the valley.

The map makers are now deleting Tide Lake from the various map sheets upon which it appears. The gaining of a salt water harbour at Tarr Inlet has been balanced by the losing of a lake. If the ice continues to withdraw, still further map revision may be required.



The Chiltern Country

by S. GORDON JOSEPH

Photographs by the author and the British Travel and Holiday Association.

IN ENGLAND no geographical feature is truly vast. Everything is a matter of scale and proportion and the Chiltern Hills in their setting are grandly imposing to the Englishman, whose countryside deals mainly in miniatures. Nowhere are they as high as 900 feet; the range is fifty-odd miles long and at its greatest width only twelve miles. The whole could be set down into Lake of the Woods and be lost without difficulty. But it is a region of immense variety in which an area five miles square seldom bears a detailed resemblance to its neighbour.

Although the Chilterns have their own name and address, they are in fact part of the chalk upland which stretches across England from the middle southern counties to the East Anglian ridge in a northeasterly direction. The Chiltern Hills themselves begin to slope from the Thames Valley at Goring and extend diagonally for 55 miles, through four counties. But nobody really recognizes them under that name beyond the great Roman Watling Street, so this study ignores the county of Bedford. Their greatest elevation is in the central section between Watlington and Tring, and the drop northeastwards is steeper than that to the Thames.

The surface rocks of the Chilterns belong chiefly to the chalk formation of Upper Cretaceous age which outcrops over a wide zone. The chalk is underlain by the Gault clay, is overlain by Eocene clay, and the complex character of these rocks is responsible for the great variety of the scene over so small an area. The beds dip to the southeast passing under the Tertiary rocks of the

London Basin, and the gentle slope of the hills in this direction is a reflection of this dip. The northwest slope of the hills is steep—an escarpment produced by erosion overlooking the vales of Oxford and Buckingham counties.

Scenically, they may be divided into the barer hills of Hertfordshire, the arboreal intimacy of Buckinghamshire and the grandeur of Oxfordshire. A peninsula of Herts juts into Buckinghamshire and includes the wedge of the Chilterns from the plains below Tring, along the Bulbourne Valley to Berkhamsted and beyond. The expanse north of the valley towards Watling Street is composed largely of gravelly, sandy soil and is mainly open land unfavourable to trees, though it contains clumps of oak and elm.

Oxfordshire takes in the section between the river and the London-Oxford Road around Watlington. Here the hills are generally lower, but there is an impressive quality of remoteness in their neighbourhood which is less apparent in the other counties. And the views from the river are glorious, for with one or two exceptions the popularization of the Thames upstream from London, has not extended this far west.

But it is Bucks which retains the major share of the Chiltern Hills and the surrounding countryside. Without detracting from the other counties Bucks is associated more strongly in the mind with the Chiltern country. It contains the largest number of celebrated towns and villages and the highest and lowest spots. It is therefore an undulating country whose chief glories are both man-made and natural—the delightful concealed villages and the beech trees. The Chilterns' bare chalk is covered with ample deposits of clay and flint and is more thickly wooded upland than usual. This is especially so in Bucks where the beech is undisputed king. In the southern part of the county near

Some of the trees at Burnham Beeches, not far from the Thames in Buckinghamshire. Most of the ancient beeches have been pollarded, so the limbs appear small compared to the great contorted trunks. There are elms, birches and hollies in the woods at Burnham as well as beeches.
B.T.H.A.

The River Thames at Marlow with the Chiltern Hills in the background. B.T.H.A.

the Thames are the famous beech-trees of Burnham some eight centuries old, whose weird shapes and seasonal changes of colour offer a unique spectacle.

From the material facts of a region's geology are derived all those features of living—scenic, occupational, architectural, historical—which make up its character. Having seen the effect of these facts on the scenery, let us turn to their influence upon the settlements of those who chose to live there. The test of a site's suitability is its fitness to sustain life at the contemporary level of culture. The clays of the region are covered among other things by outliers of Greensand and where the Upper Greensand joins with Gault, numerous springs are to be found. Thus, as might be expected, the siting of several early villages occurred in such places. A string of villages of early origin is to be found to this day along the water-bearing strips at the foot of the hills. Elsewhere are thick deposits of plateau gravel. Where glacial clays and gravel occur, the soil is diverse and eminently suitable for agricultural peoples. Of course, these generalizations are modified where external factors such as political and economic upheavals or the development of science and transportation take place.

Another influential aspect of geology besides that of the materials of the earth is its configuration. This will largely determine access and communications which in their turn will also affect the position and importance of towns. The scarp is broken by projecting spurs and winding valleys while the dip side is also well penetrated by river valleys, windgaps and dry valleys of which typical examples are located around Turville, Chesham and West Wycombe. The main valleys and passes run across the breadth of the hills between Beaconsfield and West Wycombe, Amersham and Wendover, Berkhamsted and Tring, St. Albans and Dunstable and these are parts of the main routes for road and rail between London and the Mid-

In the Hertfordshire village of Bovingdon, on the dip side of the Chilterns.

lands. In the last two instances the routes were used by the Romans almost 2,000 years ago.

Cross-routes to these are scarce because they are 'against the grain' of the natural features and rather than determining the sites of towns they have themselves usually been determined by these towns for linking purposes. There is one famous route however which runs parallel to the hills and that is the Icknield Way, keeping well into the foot or lower slopes of the scarpside. This is a route whose origins are lost in time, definitely pre-Roman, and it is believed by some to be part of an overland trade route between East Anglia and the southwest of England, by others to be a religious pilgrim way to Stonehenge. Possibly both.

Certainly the Chiltern country has been an area of settlement since the Stone Age. Neolithic man probably inhabited the high land and even Paleolithic instruments have been found while prehistoric earthworks beside the Icknield Way testify to the presence of early settlers. The thickly wooded heights were, on the whole, left unoccupied for the woodlands presented a problem to primitive agriculture and were reputed to be the haunt of outlaws. A few camps of the Early Iron Age have come to light and settlers probably inhabited the Vale of Aylesbury before Roman times. The Romans themselves did not value the area for settlement and their chief contact with it was en route between their main camps by way of the roads already mentioned, later named by the Saxons, Walting Street and Akeman Street.

The Saxons were great settlers and land-cultivators with an advanced form of plough which could tackle the heavier soils of the low country around the hills. They brought with them a social system based on the land and its communal distribution and cultiva-

Old Beaconsfield, an eighteenth century town that achieved some importance as a posting station on the London-Oxford Highway. Twentieth century increase of population has brought unsightly suburban "development". B.T.H.A.

The Market Square at Aylesbury.

tion, which was later to form the basis for a manorialism taken over and administered by the Normans after the Conquest of 1066. This manorialism, the Feudal system, which was anything but free or equal, became the prevalent order of Midland Society for the next four centuries.

The constant stream of settlers from various parts of Europe has given the region a mixed progeny. The present inhabitants exhibit no dominant lineal traits, but possess a large Celtic strain. The Celts were generally fair and the Saxons dark and we find even now that the valley people are generally darker than the hill folk. The Norman Conquest however put a stop to foreign invasions of England and the only alien settlers to the Chilterns came peacefully and in small numbers centuries later. The village populations have not altered greatly throughout their history either racially or occupationally though there have been some spectacular growths, especially in towns on the London side of hills. Conversely, some one-time thriving settlements were depleted during the Black Death in the mid-fourteenth century and in the land-enclosure movement following the Middle Ages and again later in the exodus to the towns in the Industrial Revolution of the eighteenth and nineteenth centuries.

Chiltern livestock on market day.

This brings us to the question of the occupation of the region as determined at first by its geology. In the Vale of Aylesbury a heavy, poorly-drained clay gives good grassland for dairy-farming. Aylesbury itself is renowned for its duck-fattening. In the Buckingham Chilterns the undulating land and a rather poor soil is not suitable for wheat, but the conditions are better in Hertford. The Buckingham forests on the other hand have provided the wood for woodworkers besides good hunting for the primitive food-gatherer and later, as a pleasurable diversion, for Norman and English noblemen.

Thus the people have been engaged throughout its history in agricultural pursuits and rural crafts. The former persist even in our industrialized era but the latter have all but disappeared and given way to factory production. In the very north of Bucks lace-making was introduced by the Huguenot French and Flemish refugees in the sixteenth century and survived until the nineteenth century when the lace-machine and foreign lace importation dealt the proud craft its death-blow. Workers in straw-goods were another group of craftsmen largely superseded by the machine. Wood-bodgers, only very few of whom are left, are one of the few remaining examples of Chiltern crafts-

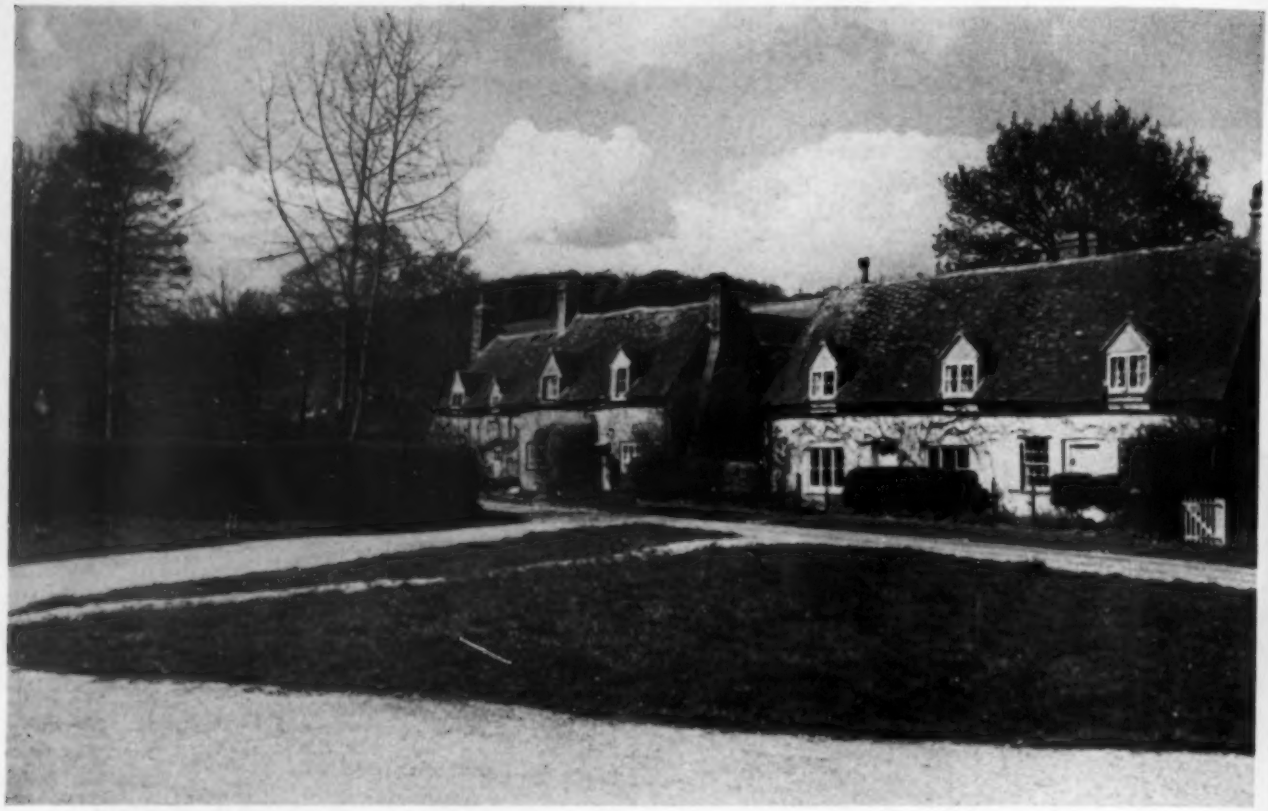
men, exercising their special skill particularly in the carving of wooden parts of chairs.

But if the decay of hand-industry is to be deplored, it is a consolation that the Chilterns have largely escaped the encroachment of urban ugliness which usually accompanies mechanization in the vicinity of larger cities. Main towns such as High Wycombe, Chesham and Amersham have in varying degrees

Top: — Modern life has not destroyed the restful charm of Chiltern villages.

Middle:—Aldbury represents a peaceful spot in the hills.

Left:—Medieval stocks on the village green bear testimony to old customs.



Cottages by the Green at Turville. The weathered tile roofs are typical of local building, most of which is done with brick, timber and flint.
B.T.H.A.

Interior of William Penn's Meeting House at Jordans. Penn is buried in the graveyard.
B.T.H.A.

been deprived of much of any former charm; though a town like old Beaconsfield on the main London-Oxford road has somehow escaped the ravages of pre-war building and remains a harmoniously composed and dignified example of an eighteenth century town. In the plains underlying the scarp, Aylesbury has grown but has not lost the quality of the bustling English market town.

Many of the old villages of the region have been left untouched. Places like West Wycombe, Turville and Chalfont St. Giles are lovely examples of valley settlements whilst Dinton and Lower Winchendon in the Vale of Aylesbury are of outstanding beauty, with their sturdy cottages and fine churches and houses. In the hills is a host of villages hidden in the forests and hollows from the current of modern life and the unknowing traveller can

even miss beautiful settlements in the open plain which lie off the main routes.

As in the rival Cotswold Hills, the beauty of the villages results from the harmonious arrangement of domestic architecture. Flint, brick and timber were the local building materials and, combined in many variations they were the basis of the characteristic architecture of the Chilterns, from the flint church to the half-timbered cottage with brick filling, and the mellow tile roof common to both. Great houses such as that at Cliveden or the Hall at Dinton and parish Churches ranging from Saxon, through Norman and Gothic to Victorian furnish examples of British building at its best.

Thus far we have considered the Chiltern scene passively, as a result of local historical and geological factors. But no picture of the area would be complete without a brief description of the role it has itself played in English History. The Chilterns peered over King John's shoulder as he presided at the sealing of the Magna Carta. With the great seventeenth century Civil War to check the power of the monarchy the region found itself in the centre of the turmoil, one of its sons, John Hampden being largely instrumental in setting off the spark to the conflict. It has been the home of champions of liberty —poet Milton of Chalfont St. Giles; William Penn, founder of Pennsylvania, at nearby Jordan's; and Disraeli. Not least, Elizabethan Chequers is the country seat of the prime minister of Britain.

Small wonder then that the stature of the Chilterns is not measured in terms of physical elevation alone.

Milton and his family came to this cottage at Chalfont St. Giles to escape the plague. It is a timber frame building with local brick filling. B.T.H.A.

The Deichmanns creating things of beauty: Kjeld at the potter's wheel and Erica decorating a plate. The tapestry on the workroom wall is in an old Danish design symbolizing Creation.
Climo Studios

Creative Hands

by JEAN MacCALLUM SWEET

MOST CANADIANS who are interested in modern art, and many Americans, know the Deichmann pottery—the lamp bases, the bowls, the jugs, the tableware, the ashtrays and plaques. We can see them in art and handicrafts exhibitions and in the ceramics displays of museums and galleries. Magazines have carried Deichmann pictures and the story of their work.

This is the story behind the story—the story of the artists' way of life, and of the birthplace of those gleaming pieces which may well become heirlooms.

It must be fifteen years since my first visit to the Deichmanns. They were living then in the house just below the road. It looked like a little house, little and old. But inside it seemed bigger, and the matter of age became doubtful. That was my first experience of what Kjeld and Erica can do, and I went away from there thinking about it. I've thought about it after each of many visits to Dykelands since; through many changes in each room, through the move into the pottery building, and through their growing importance in the world of art to acceptance in the higher art circles of the continent.

I think now that their future was assured when they first put hands to that little house, and did what they could with it. It was all there, in the understanding of line and colour, and their ability to compromise with material at hand, and make something of it. They had the secret of living when they built a field-stone fireplace in an ugly

old shed—and they looked at the ruins of an ancient unpainted barn, weathered to a most beautiful silver. And they brought the boards to the shed to line the walls. And the only colour was the deep glowing red of the bookshelves and the lovely greens and turquoises of their own pottery pieces. That was the way they built their home into something all theirs—genuine Deichmann.

Erica had her loom up then and was weaving covers, curtains, and spreads. The press of pottery work has long since banished the loom, but its products are still in use about the home.

It was inevitable that a real contribution to the world of art should come from these two young people with their facile hands, fine sense of discrimination and their will to work. The Deichmanns are people who could have settled anywhere in the free world and reached a high level of achievement.

We in New Brunswick are happy that they chose to live their productive lives and raise their children among us. Strangers, wanting to know more about them, find that both are of Danish origin, although Erica happened to be born in Wisconsin. During her childhood the duties of her father, a Danish dean, alternated between Denmark and the New World. This nomadic life gave her education a special kind of flavour and helps to explain her knowledge and understanding of people.

Kjeld is a philosophy graduate of the University of Copenhagen and studied for two years in France, as well as shorter periods in Italy and Vienna. He studied art, and found a special interest in sculpture. And then he decided to come to Canada. He covered much of the Dominion in search of a home, and finally chose this hillside farm, overlooking the broad Kennebecasis River and reaching down to its shores. Before long his young fiancée arrived at the port of Saint John only a few miles away, and they were married.

Erica did not have long to wait to meet her new neighbours. The first night in the new home they arrived from far and near to give her a real old-fashioned welcome.

Dykelands is only a few miles from Saint John but the whole Kingston peninsula is peculiarly isolated by wide rivers. The nearest approaches are all by river ferry. In mid-winter, when the ice is solid, roads are "bushed" (marked by rows of evergreens) and it is possible to drive across on the ice. But in late fall and early spring when the ice is too heavy for ferries and too light for cars, the only route to the city is the long drive round by the Hampton bridge.

Erica was thinking of this, and of her wonderful new neighbours when she unpacked her books, so she started a free lending library on Kingston peninsula. There were no rules. Neighbours came, visited and borrowed a book. When the book was read it came back. News of the library spread, and gifts of books augmented her supply. This was the first contribution of these new Canadians, to the community life.

There was never a question of their acceptance into this old Loyalist settlement. Before long Erica found herself being called upon when there was sickness. Her sympathy and calm practical sense were as helpful as her small knowledge of home remedies.

Meanwhile they were working at the transformation of their home. Digging a drain one day, Kjeld picked up a handful of clay and tried moulding it. It held shape wonderfully, and reminded him of the work of the famous potters of his homeland. They closed the farm, and sailed for Denmark to study pottery techniques.

The first years after their return were hard and discouraging ones. The wood-burning kiln Kjeld built had to be fired constantly through long hours. It soon developed flaws which ruined many pieces, often a whole firing—perhaps a month's work. Erica was experimenting with glazes, and sometimes new ones failed to react properly in the heat, and more pieces were spoilt. Soon after their return from Denmark, Henrik appeared and babies need time and attention. But the work went on.

At last the best pieces began to find a market and command attention. Many with

small flaws would have sold, too, but although daily living became something of a problem, Kjeld and Erica broke hundreds of pieces in those first years because they would not let them go out as "Deichmann".

They built new kilns; they imported clay to mix with their own; and the tedious experiments went on—all numbered and recorded until the lists in the books and the numbered pieces reached into thousands.

The earlier work was inclined to brittleness, which they strove to overcome by changing temperatures and by mixing clays, until now their stoneware, made entirely from Nova Scotian clay mixed with ground rock and fired at a very high heat, is strong and hard, and has a ring like a silver bell when struck with a snapped finger. Pieces of varying size give different notes, like a small carillon.

Beth followed Henrik, and then Anneke. The children have always been an essential part of the Deichmann picture. When they were small they roamed the woods, fields and shore near home, attended the country school up the road, and returned at mealtimes to greet without discrimination whatever guests might be there. A neighbour, a friend from the city, a university president, an art director or museum official—they were all the same to the Deichmann children. They have lived their lives in the country, but they will never be ill-at-ease wherever they go, because People have always been their friends. They are entirely free of the caste-consciousness of city youngsters.

Now Henrik is at the University of New Brunswick, finishing his first year in Forestry. Beth is sixteen and will soon be leaving high school, and Anneke is fourteen and the world is hers.

It was natural that the artists of Saint John were among the first friends the Deichmanns made in the city. The other arts followed because their interests embrace them all and their wide circle now includes painters, musicians and writers.

We all remember, in their earliest struggling days, how Kjeld and Erica pedalled the long miles to Saint John on their bicycles, to attend a play, a concert or an art show, and often had to leave early to catch their last ferry. Clothes suitable for cycling muddy or dusty roads were not common at these gatherings, but the Deichmanns had that hunger for "the best things" which does not include the creations of Paris or Bond Street.

Now they have a car, and even through the winters when transportation is so uncertain, they are seen whenever possible at symphony concerts, art exhibitions and discussion groups. Often one or more of the children is with them, for they are a family that share what they value most.

The Deichmanns are naturally creative people in every phase of life and their home has never become static. Years ago they started spending winters in the pottery building, to be near the work in their most pro-

The pottery under the hill, overlooking the Kennebecasis River.
Richard Harrington

ductive months, for guests leave little time for work in summer. Finally they converted the building for full-time living and remained there.

The pottery was a big, strongly built old barn, on the hill across the road from the house. They moved it to a spot near the shore. When I first saw it the kiln was on an earth floor in the middle of the structure. A workroom had been floored and sheathed at one end and a utility room was a few steps up at the other end. When they moved in for winter, they partitioned rooms in the loft in the most unexpected places. By this time the three children had arrived. One bedroom was reached by a step down from floor level—another by three or four steps up—another by a catwalk with railing, across an unfloored space. There was even one at floor level.

Now each of these rooms has been changed and improved, but changes in the ground floor have been more spectacular. The centre area is now a sort of living-room, and the earth floor is covered with scrubbed red brick. A dining balcony, three steps up, opens into the kitchen, which has been in several places, but seems to have settled here, looking over the river beyond the flagged terrace. In good weather, meals are taken outdoors, wherever the sun is shining. The kilns have taken up residence in a special building and in their place is a remarkable open fire under a huge metal cone. Beyond the fireplace is the newest room, a small library. Whenever a discussion arises about mixing old with new, I remember this room. The soft warm colours of old book-bindings, the new white of unfinished wood, the odd old chairs, the miniatures of ancestors on one wall, contemporary paintings on another, and the clean lines and colour of the stoneware pieces all blend without a discordant note.

Finished work is displayed in the River Room, at the east end of the building, and the river reflection from the wide windows picks up every gleaming piece. When you have your fill of looking—if you do—you can step down and rest in the small room at the end. Here there are more books, for

One end of the River Room at Dykelands, showing some of the early New Brunswick furniture the Deichmanns have adapted to their needs.
Capital Press Service

books and pictures overflow into every room in the house.

Some of the pictures are modern, others are the work of Kjeld's aunt, Christina Deichmann, who gained special fame for her water-colours of life in Greenland. The books add to the story of Kjeld's background. Some of them are in Danish and many of these represent the work of ancestors and members of the family. Probably the most interesting, to modern readers, are the first editions of his great-great-uncle Soren Kierkegaard, widely-read philosopher of the past century.

The Deichmanns have achieved something. They have worked. It is less than two years since electricity came to the entire Kingston peninsula, bringing refrigerators and other home comforts many of us have long thought essential. But even now, the soft glow of the candles they love to use seems right for them and their surroundings. You can feel their labour and their special peace, when you sit in one of the old chairs by the fire, and look about, and know that their very life is in all you see.

All the furniture bears the mark of their hands, furniture chosen through years of country sales, refinished and adapted to

Two views of the living room showing (left) the dining balcony and (right) the unusual fireplace.
Climo Studios

themselves. Their ingenuity seems inexhaustible. They bought chests of little drawers, when a drug-store closed, and scraped the layers of paint down to the wood. They removed the knobs and bored two holes to give them rope handles. These are the storehouses for experiments, each labelled and numbered. Shelves, old chests—they look for the thing that nobody wants at a sale, and see beyond to its special use for them.

Now their stoneware is displayed in the museums of the continent, their work is recorded in movies, their specially commissioned coffee set was presented to our Queen when she visited Canada as Princess Elizabeth. Experts say they are doing more in the field of creative pottery than anyone in the modern world. But they will never be rich, in currency. Each piece is fashioned by the two pairs of strong sure hands, and it all takes time; there will never be a flooded market.

And they save some time for their friends. We marvel at how Erica works, and keeps the place Danish-clean, and finds time for her herb-garden, and to prepare for her friends the delicious meals served on their own beautiful pottery.

There is something about Dykelands. You may approach it burdened with the fears of the world or the state of the nation, or even little personal problems. But when you stand in the doorway of the River Room they fall away, and you feel fresh and new, for the Deichmanns have built not only fame, but a way of life.

EDITOR'S NOTE-BOOK

Manitoba-born Rex E. Grose, after service overseas during the war, entered the public service of Manitoba, where he gained experience in various departments. Mr. Grose is now deputy minister of the Department of Industry and Commerce.—L. G. Temple is a British Columbia writer. He has seen the province from many angles, having been with the provincial government's first completely airborne topographic survey party.—S. Gordon Joseph is a contributor from England who has made a special study of the British scene.—Jean M. Sweet is well known as a writer about her native province of New Brunswick. Mrs. Sweet is the author, with Dr. Jessie Lawson, of *This is New Brunswick*, published by Ryerson in 1951.

* * *

Principles of Geochemistry

by Brian Mason

(John Wiley and Sons, Inc., New York, $5.00)

The author of this volume is associate professor of geology at Indiana University. He took his undergraduate work at the University of New Zealand, graduating in 1937. Since then he has carried out field studies and teaching in New Zealand and postgraduate work in the laboratories at Oslo, Norway, in association with Professor V. M. Goldschmidt. He received his doctorate from the University of Stockholm, Sweden, in 1943.

This is a volume for which there is a special need, one which applies the principles of physics and chemistry to the processes which are at work both on and within the earth, and interprets the great mass of information available in the light of these principles.

Starting with a statement of what geochemistry is it proceeds to discuss the earth in relation to the universe, the relative abundance of the elements and isotopes in the earth and universe, the structure as well as the composition of the earth and its pregeological history. Magmatism and the geochemistry of igneous rocks are dealt with at considerable length, followed by a treatment of the geochemistry of the hydrosphere, the atmosphere and the biosphere. The geochemistry of the hydrosphere is concerned chiefly with the problem of the origin and evolution of the ocean. That of the atmosphere deals with the character of the original atmosphere and the subsequent changes it has undergone. The geochemistry of the biosphere has to do with the amount of organic matter, its composition and the part played by organisms in the concentration of

(*Continued on page VIII*)

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(*Continued from page VII*)

certain elements. Finally, metamorphism and metamorphic rocks are discussed from a geochemical point of view. The closing chapter is a résumé entitled The Geochemical Cycle.

The volume will be of interest to all geologists and also to others interested in the physical and chemical evolution of our earth.

F.J.A.

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A Many-Splendoured Thing

by Han Suyin

(Clarke, Irwin, Toronto, $3.25)

The title of Han Suyin's autobiographical novel is from a line of Francies Thompson's poem, "The Kingdom of Heaven", and is used to describe her life during the thirteen months she knew and loved Mark Elliott. A Eurasian, trained in Europe, she was a doctor in a Hong Kong hospital when she met Mark, a foreign correspondent for a London newspaper. It was June, 1949, and Dr. Han was determined to return to China, where she had lived before her husband had been killed fighting Communists. She felt that everything pulled her back to China, where she meant to bring up her daughter. While primarily the book is about the relationship between Han Suyin and Mark, who died in Korea, there is the tumultuous background of Asia in a time of revolution.

The social problems of such a world occupy much of Dr. Han's mind. Misery and pain, she says, are so much more important than any politics, for politics are passing things, but pain, hunger and poverty, like the proverbial brook, go on forever. She experiences much of beauty, but sees much of ugliness, too.

A Many Splendoured Thing, although wordy and mystical in spots, contains a lot of fine writing and has an authentic ring. It is the personal testimony of one physically and emotionally involved in the titanic struggle now going on in the Orient. F.H.W.

White Horizon
by Douglas Liversidge
(The Ryerson Press, Toronto, $3.50)

In 1950 the world's attention was focussed on the Antarctic when a rescue expedition was organized to relieve eleven Britons stranded at Stonington Island the southernmost base of the Falkland Islands Dependencies Survey, in Graham Land. Five of the men had weathered three years at the lonely post; the others, two years. The relief ship *John Biscoe* had tried to reach them once but, because of heavy ice, had been forced back. The final expedition, named "Operation Corkscrew", included a Canadian Norseman plane equipped with skis and floats and piloted by F/O Peter St. Louis of the R.C.A.F.

Mr. Liversidge, a Fleet Street journalist, was assigned by Reuters to cover the rescue, and his account of it is a fascinating narrative which does much more than detail the accomplishments of the expedition: it explains how and why the five million square miles of Antarctic wastes are so prominent in international affairs.

The marooned men were scientists of the Falkland Islands Dependencies Survey, searching for minerals and studying the weather. The preparations for their relief consumed months and the struggle of *John Biscoe* through the treacherous ice fields was agonizing. The Norseman and another plane, a British Auster, were to be used to bring the men out if the ship was unable to reach Stonington Island and, indeed, some of the men were flown to the vessel while it was still miles away from its goal. However, the ship finally crashed through to the base and it was possible to remove much equipment and some of the dogs, although others for whom there was neither room nor food had to be destroyed.

There have been 160-odd expeditions to the Antarctic, of which Great Britain has sent roughly half, and at various points on the voyage of the *John Biscoe* the author found signs left by earlier adventurers. Here and there he delves into history to recall prodigious feats of endurance and courage. Excerpts from the diaries of the Stonington Island men show that they were of the same bold stamp as their predecessors, and it is evident that all of them, and the author himself, were affected by the strange allure of the White Continent.

There are interesting chapters on the penguins and seals of the polar regions, and one chapter gives a vivid picture of the whaling industry at Grytviken in South Georgia, where Shackleton lies buried. Photographs taken by the author enhance the book, but it is unfortunate that a map showing the places visited was not provided for the reader.

F.H.W.

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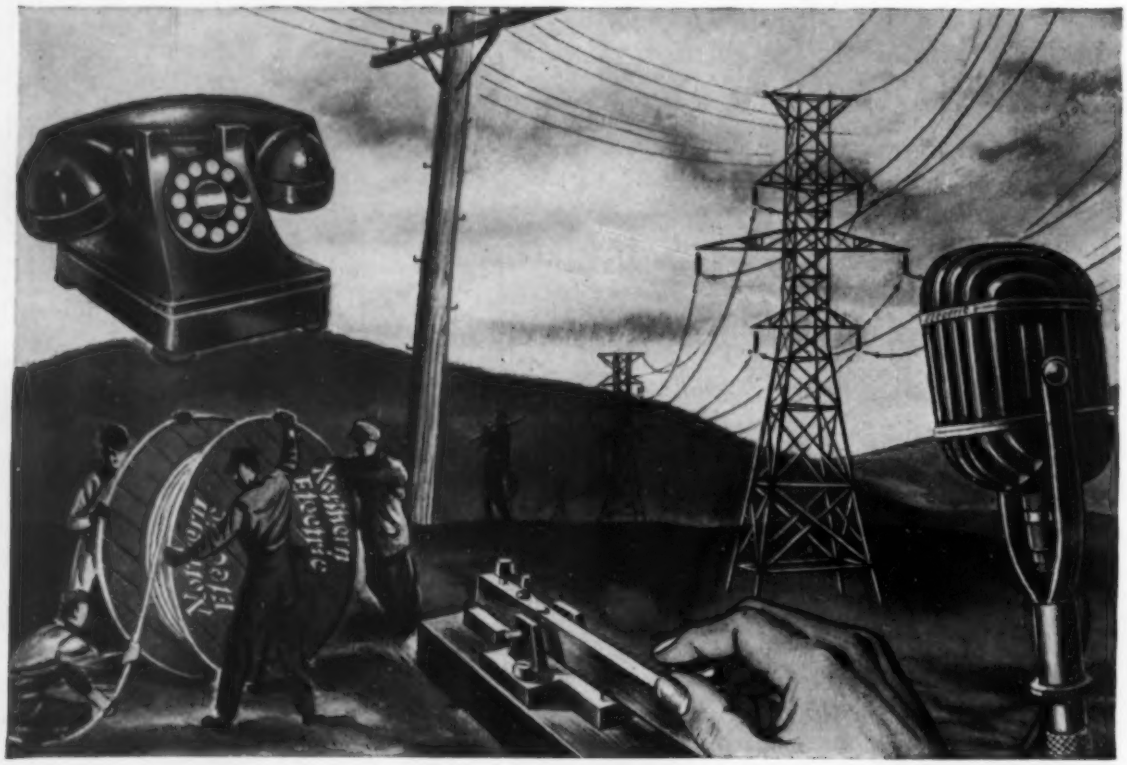

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The Spirit of London
by Paul Cohen-Portheim ($2.50)
Beyond the Great Glen
by F. Reid Corson ($3.15)
(Clarke, Irwin and Company, Toronto)

Few cities have been the subject of more books than London. Few so completely defy description or repetition. London is the inexhaustible city. Because of this, no apology is needed for any new book on this subject. Certainly none is expected for the newly published revised edition of Paul Cohen-Portheim's *The Spirit of London*.

By its title, the aim, scope and limitations of this book are clearly defined. This is not a guide-book, though it hopes to guide. Rather, it is the complement essential to one, possessing little detail and a wealth of lyrical ideas and opinions which serve to enliven dull facts. Cohen-Portheim is concerned with facts and figures only as they help to convey the atmosphere of London, what it means and what it stands for. But what is the 'spirit' of a city? It is not the buildings, nor the people, nor its heritage, nor its customs. It is none of these and all of these. It is felt and can be recognized, yet is intangible.

The author seeks to capture the quality of this enigma. By virtue of his acute powers of observation, of his ability to select what is significant from what is not, he succeeds. His range is wide. He goes from Whitehall to Westminster, from Piccadilly to the Elephant and Castle. He sees cricket at Lord's and London policemen. He sees the parks, the tree-lined squares, the palaces and the pubs. He disregards much that is famous, and frequently pays only scant respect to many of the established landmarks. He is interested in the living, breathing city of the present day, perhaps to the excessive exclusion of the past. In London the two are inextricably bound together.

This book is a series of sketches and the solution to a mystery. Perhaps without knowing exactly how he has done it, Paul Cohen-Portheim has caught and held the essence of London. It is London seen by a foreigner. Necessarily so, for Londoners have rarely been eloquent or boastful of their own city, though their devotion is faithful. It was not a Londoner who wrote

> London, thou art of towns a per se.
> Sovereign of cities, seemliest in sight . . .
> London, thou art the flower of cities all.

That was William Dunbar, a Scot, born in 1495.

The Spirit of London was written in 1935. It has been revised by Mr. Raymond Mortimer since the author's death. The book is a personal one, written sensitively and illustrated with many excellent photographs. It is undoubtedly the best book on this subject that I have